Established 1914

CHEMICAL MARKETS

VOLUME XXX NUMBER 3

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CHEMICAL MARKETS *is indexed regularly in the* INDUSTRIAL ARTS INDEX

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CHEMICAL MARKETS

VOL. XXX MARCH, 1932 NO. 3.

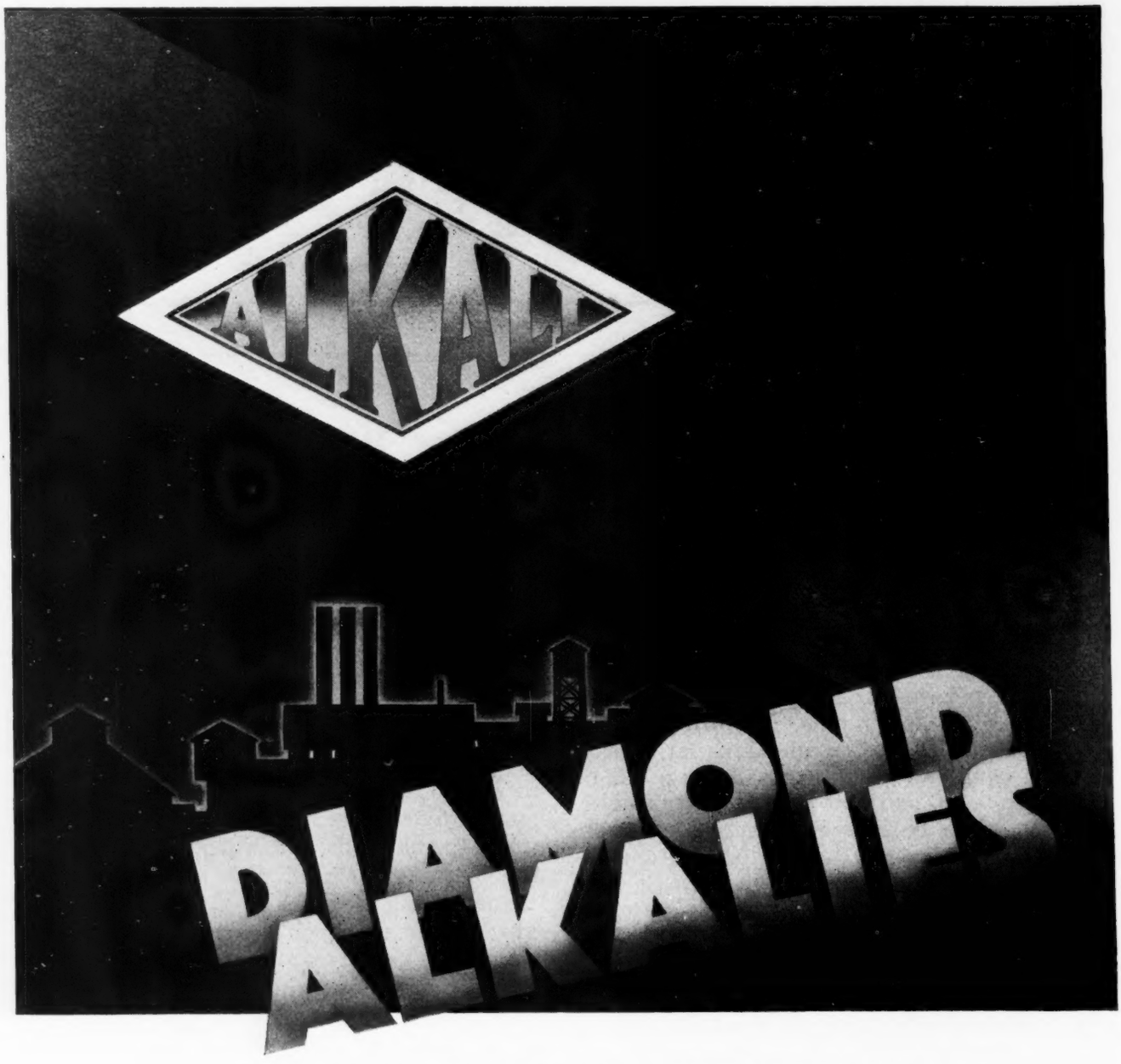
Sales Taxes Right or Wrong

HAVING combed all possible sources of revenue, the Ways and Means Committee has concluded that some sort of a sales tax is inevitable to furnish the funds necessary to meet even the sharply reduced Federal budget. The announcements of the party leaders leave plenty of comfortable latitude as to just what type of sales tax will be proposed and how large the rate will be. It is to be hoped that the Democrats have the courage of their conviction and do a thorough-going job.

A UNIVERSAL sales tax—better known as a turnover tax—that is, a tax on every single sale of all goods and all services in the country would furnish an astonishing volume of revenue even at a very low rate. Its completeness and small rate remove from such a levy the common objections to a sales tax. Even as small a rate as two-tenths of one per cent, as is pointed out in an article on another page of this issue, would supply a greater revenue to the Government than the present business profits and personal income taxes.

SO SMALL a tax on sales—20c on $100.00—would undoubtedly be absorbed in practical business as a part of the overhead. Obviously it could be absorbed quite easily and without any change in prices. The simplicity of the tax not only appeals to the business man, but would effect tremendous savings in collection and administration and auditing expenses on the part of the Government. The fairness of the tax is obvious, and it does not preclude the possibility of income levies upon such unearned sources as stock dividends, bond interest, etc. which might continue to be collected upon the old principle of "the ability to pay." At the moment a most telling argument in favor of the turnover tax is its rather remarkable ability to raise revenue during times of curtailed business activity. This is the point at which the present law is peculiarly vulnerable, and this is certainly a chapter very seriously to be read these days.

IT IS an auspicious moment for the simplification of our Federal tax system. Never was a sound and efficient method of raising Government revenue more needed and never will a constructive program be more attentively studied or so thankfully received by the country. The Democrats are presented with a golden opportunity to revise our national taxes with a proved system that, as Dr. Grosvenor points out, is just and efficient.



The constant unvarying purity and uniformity of all Diamond Alkalies commands immediate approval wherever used . . . their nationwide distribution and their quick availability make friends among the most exacting consumers everywhere. Let Diamond serve your needs.

Diamond Alkali Company

PITTSBURGH, PA. *and Everywhere*

"Old Heads For Counsel" Three distinguished chemical executives have recently come out of retirement and are back at their desks again. Each tells a similar story. They had withdrawn from active affairs with a comfortable competency, planning to enjoy their hobbies and a well earned leisure. All have found their income curtailed. One of them has returned to business on his own account, but the other two have associated themselves with two of the largest companies in the industry.

The return of these veterans to active service is more than a mere coincidence, more even than a sign of the times, for two of them have been specifically called back because their experience will give their companies a guidance needed today.

The executive decisions, as some wag has pointed out, are twenty per cent facts and eighty per cent hunch, which is merely another way of saying that there are so many "ifs" and "buts" in even the very simplest business situation that a "yes" or "no" must be said almost upon intuition. The wisdom of that intuition depends largely upon the experience behind it. Such an experience gives a background for comparison and a foundation upon which to predicate the results of action that cannot be acquired except through years of meeting similar situations, discussing their causes, and observing carefully their results. In such matters the counsel of older men is invaluable, and it is not alone that we are facing today a phase of business through which many of our younger executives have never passed. It is probably saying too much to claim that the day of the young executive has past, but there is very certainly going to be a much more wholesome respect paid to the counsel of the older men during the next few years.

Exports Exceed Imports Our 1931 chemical exports valued at $130,645,000 exceeded imports by some $12,000,000, but were twenty-four per cent less than in 1930 while imports dropped thirty-one per cent. Exports exceeded the low points of 1921 and 1922, but were considerably below all recent years. Imports were the lowest since 1912 omitting, of course, the war period.

Export and import figures indicate some remarkable shifts in chemical trade. Four years ago ammonium sulfate was seventh in the list of chemicals exported, while in 1931 it was relegated to the fifteenth position. Our international position as leading exporter of sulfur suffered no set-back and accelerators have proved to be a fertile field of foreign sales, for in 1931 2,200,000 pounds valued at $41,157,000 left this country.

On the import side of the trading ledger there are even more interesting comparisons. Ammonium sulfate imports in 1927 were negligible: today this source of nitrogen ranks ninth in the list. Removal of the import duty and low prices abroad are responsible for this situation. Despite our advances in dye production, our dye imports moved from ninth position in 1927 to fourth in 1931. Perhaps the most striking change of all is that of creosote oil imports. In 1927 this product held second position in the import list with total receipts of 95,900,000 gallons and in 1931 eighth with 36,900,000 and contrariwise we exported close to 2,000,000 gallons. Because of its increasing use in the manufacture of non-shatterable glass and also pyroxylin plastics, camphor has enjoyed a real boom. Import figures for 1931 of 2,010,000 pounds of crude natural valued at $716,000; natural refined, 1,152,000 pounds valued at $545,000; and synthetic camphor, 1,798,000 pounds valued at $588,000 indicate the growing importance of this material as an industrial raw material.

Shades of Rothschilds "Mercurio-Europeo," the Lausanne sales organization of the Italo-Spanish Mercury combine, has transferred most of its sales activity back to the London company that formerly handled the mercury sales in England. As the "Chemical Trade Journal" points out, London has again become the world center for the sale of mercury, a position she held in the days when the Rothschilds controlled the putput of the famous Almadan Mines. It is further reported that the London firm have agreed to market 30,000 flasks annually until 1934 when the present cartel agreement terminates. The Italian mines have been allocated 12,000 flasks, the 18,000 remainder of course going to the Spanish producers.

What effect will the new arrangements have on the market in New York? Probably they will exert but very little stabilizing influence. Stocks on hand are reported to be between 120,000 and 150,000 flasks. This can be only a very slight decline from the 1930 surplus. The pressure on the market exerted by domestic producers and those producers in other

countries not members of the syndicate is still extremely heavy and will likely continue to be so for sometime. On the other hand, the market in this country has held at a fairly stable level of about sixty-five dollars for several months. Production costs must be very close to this price.

Considered more broadly, the return to London is another significant indication that many of the cartel arrangements so enthusiastically entered into in the piping days of the late twenties do not bear the strain of economic reconstruction. Dr. Marks reviews these unexpected developments in this issue, and while he avoids prophecy he does translate the writing on the wall.

A New Cellulose Ether February issues of British trade papers featured the announcement by the Imperial Chemical Industries of the commercial production of a new cellulose ether, benzyl cellulose. The product is to be on view at the forthcoming British Chemical Industries Fair, and if pronouncements indicate fairly the general interest, it should create a stir in the plastics and lacquer industries. Three years ago, however, the I. G. Farbenindustrie placed benzyl cellulose on the market at the same time as it did the more widely employed ethyl cellulose. In Germany the commercial exploitation of benzyl cellulose has progressed neither far nor rapidly.

While the commercial availability of this interesting member of the aromatic cellulose ether series may be news, experimental work has been going on for years. As Dr. Mullin shows in his series of articles on the cellulose ethers commencing in this number, the first mention in the literature of benzyl cellulose was in 1919 when Dreyfus was granted a patent covering the substitution of one or more benzyl groups for a corresponding number of hydrogen atoms in the cellulose unit by treating cellulose with water, powdered alkali, and benzyl chloride. It was not until somewhat later that the I. G. was granted a patent covering a process for the preparation of benzyl ethers of cellulose by heating a benzyl halide with alkali cellulose, or with cellulose in the presence of an alkali.

Benzyl cellulose possesses great powers of resistance to the hydrolyzing effect of acids and alkalies; is quite impervious to water; and has electrical properties of distinct advantages. It certainly appears to offer interesting possibilities to the chemist engaged in the production of lacquers, film, moulding powders and plastics, and commercial production in this country will doubtless follow the finding of industrial uses.

Quotation Marks

By farming intensively, with enough fertilizer to make up for soil depletion, I find that American farmers could have converted a nine-year loss of $1,250,000,000 on wheat into a $3,000,000,000 profit—and at the same time they could have cut their acreage in half—*Horace Bowker.*

The evils inherent in Government operation of any enterprise on a commercial basis cannot be emphasized too often or too strongly. Unfair and oppressive competition with private industry is an outstanding factor and affects the investments of thousands of citizens in private enterprises subjected to such rivalry.—*Manufacturers' Record.*

Obsoletion and over production may, perhaps, be caused by lack of complete correlation between chemical research and distribution methods. This statement is not to be interpreted as intimating that research should wait upon demand, for fundamental research, of course, must go on. Chemistry, while engaging in an industrial co-operative program, must not neglect pure science. The question arises, then: How much of an interest should the chemist evidence in general economics? How far should he concern himself with specific economic problems of the day? Surely, the average chemist should be sufficiently interested in them to be able to discuss in an intelligent manner the signs of the times.—*J. N. Taylor, The Chemist.*

Research is essentially a speculation, but it differs from most speculations in that the odds seem to be weighted heavily in favor of the speculator, so that if industrial research is undertaken with competent men and is allowed to carry on in the face of difficulty and failure, profit is almost inevitable.—*Dr. C. E. K. Mees.*

Fifteen Years Ago

N. Y. Section of the A. C. S. is addressed by Drs. Edgar F. Smith, C. F. Chandler and Nichols on occasion of its 25th anniversary.

Barrett Co. directors increase preferred stock from $5,000,000 to $12,500,000 and the common from $15,000,000 to $25,000,000.

The Kalbfleisch Corp. completes new plant at Chattanooga, Tenn. and purchases land for Elizabeth, N. J. works.

Prof. John E. Bucher, Brown University announces his process for the fixation of nitrogen without the use of electrical power.

CHEMICAL MARKETS asks editorially "Are You Ready For the Call To Arms" and suggests that the American Navy may be in conflict in 20 days.

Davison Chemical stockholders file bill of complaint asking that the company be forced to disclose financial arrangements of the increase in capital stock made in 1913.

Cartels in Depression

By Dr. Lewis H. Marks*

IMPLICIT in the cartel idea has been the belief that if a thorough going control may be established over supply, that this will counter-balance any effect of demand upon price. With a firm grip upon production, a strict allocation of market, and a centralized restraint upon competition; it has been the cartel belief that price became an incident and would more or less take care of itself upon a steady and established level which would not change materially, either in good times or in bad. This is a laudable ambition, both for producer and consumer; a steady price particularly on industrial raw materials is a double advantage. Since the era of the cartels in Europe which anti-dated the World War, but which were greatly stimulated by the economic consequences of that calamity, business the world over has enjoyed both good times and bad, and it is particularly interesting to see how this theory has held up during the past two years.

It is important to keep clearly in mind the distinction between a cartel and a combine. A cartel is an association of independent enterprises organized for a definite purpose; the combine is a combination of enterprises by means of financial control. International corporations or other types of business enterprise with interests in more than one country date as far back as the beginning of civilization, but the first generally known international cartels were not organized until the end of the nineteenth century, the International Rail Cartel of 1884. It was organized for a period of three years and included all British and Belgian and most German producers of rails. In a book published in 1897, Robert Liefmann, one of the leading authorities on cartels in Germany, enumerated forty international cartels existing at that time.

The outbreak of the World War destroyed completely the pre-war cartel structure, and the organization of the international cartels after the War may be regarded as a new movement, the result of the peculiar economic and financial conditions created by the dislocation of business and trade. Europe had ceased to be the banker of the world and was faced with the gigantic industrial and financial rise of the United States. The problems of distribution, production, price fixing, and allocation of territories became of paramount importance under these circumstances, and it is natural that the European producers should have sought a solution for their difficulties in international industrial agreements. As soon as the chaotic post-war inflation was over and foreign exchange fluctuations became confined within reasonably narrow limits, the pre-war cartel structure began to be rebuilt and many new cartels organized. The leadership was again assumed by Germany, whose dependence on foreign trade had become even more extreme after the loss of considerable raw material resources, particularly iron ore and potash, and the need of transferring abroad large sums for reparations.

The first important international cartel to be reorganized after the war was the International Incandescent Lamp Cartel, which came into existence in 1925. In 1926 seven other important international cartels were organized, including such commodities as rails, aluminum, steel, copper, rubber tires, fertilizer, potash, carbide, and bone glue. In the following five years, the producers of carbide, ferrosilicium, nitrates, rayon, bismuth, white lead, dyestuffs, zinc, quicksilver, thread, wire, paper, tubes, raw cork, bromide, bottles, plate glass, lead, platinum, coke, sugar, and cement found it necessary or advisable to enter into international agreements for the purpose of production or distribution control.

Proponents of cartel control and management contend that the enormous waste of uncordinated production is *prima facie* argument against the competitive system and that the losses periodically caused by violent price fluctuations, and which are unavoidable

*Executive secretary the Industrial Alcohol Institute

as long as each individual enterprise within an industry and the industries in the different countries make plans independently, on the basis of more or less haphazard guesses of probable domestic and foreign demand, make controlled or planned economy absolutely indispensable. The European rationalization idea has been inseparably connected with the combination movement on a national and international basis, and rationalization involves two distinct ideas: scientific management proper and industrial combination for the purpose of introducing improvements in production and distribution that are impracticable or beyond the strength of a small concern. There is a definite limit to which economies can be secured by increasing the size of an enterprise, and this limit varies from industry to industry. In many industries that limit is low, and in all industries it is reached long before the position of monopoly is obtained. With this distinction in mind it is clear that the advantages of cartelization are essentially the advantages of monopoly control—of arbitrary regulation of production, fixing of prices, and division of markets. Many advocates of cartel control not only admit that a cartel must have monopoly power but claim that monopolistic control of prices is the *raison d'être* of cartelization, all other considerations being of secondary importance. This claim seems to be substantially accurate. It does not apply to those industries which are based on patents and scientific processes. The consumers of the products of these industries are obviously benefited by the widest possible exchange of information among the producing companies in all parts of the world.

Why Certain Cartels Are Successful

Among the international cartels that have been operated with a fair degree of success we may mention the German-French Potash Cartel, the Italian-Spanish Mercury Agreement (Mercurio Europeo in Lausanne), the International Incandescent Lamp Cartel, and the International Dyestuffs Cartel. The Potash and Mercury Cartels each involve only two countries which find themselves in an especially favorable position through the absence of any effective competition by the other countries.

The Potash Cartel, owes its existence largely to the extremely drastic measures undertaken by the Federal Government of Germany to prevent competition in the German market. As is well known, competition among German potash producers has been practically eliminated by the Potash Mine Closing Decree (Stillegungsverordnung) of 1921. This decree prohibited the opening of new potash mines or sinking of new shafts until December, 1934.

The European Dyestuffs Cartel, organized in 1929 between the producers of Germany, France and Switzerland, was renewed in November, 1931, and strengthened by the participation of the British producers, particularly the Imperial Chemical Industries, Ltd., which controls British chemical production, the Clayton Aniline Company and the L. B. Holliday & Company. The participation of the I. G. Farbenindustrie of Germany, the Etablissements Kuhlmann and the Societe des Matieres Colorantes de Saint Denis of France, the Chemische Fabrik Sandoz and the I. R. Geigy A. G. of Switzerland in the new cartel assures practical supremacy in the world production of aniline dyes. The ability of this cartel to survive under the pressure of the world business depression is due to the unusually marked degree of concentration that prevails in the industries of each individual country and to the more or less intimate relations existing among the principal producing companies in the world. A special factor in the situation is the dominant position of the German aniline dye industry, with the I. G. Farbenindustrie at its head. Finally, the manufacture of dyes is based on patents and secret processes, and the entrance of new producers is very difficult.

Outstanding Cartel Failures

Other international cartels have had a stormy career during the past two years. The most famous of them all—the Continental Steel Cartel, which had been heralded as the precursor of a European Customs Union—has been several times at the point of collapse, and, although it is still in existence, its influence is practically negligible. All attempts to broaden authority by giving the power to fix prices have failed, and charges of price cutting and dumping have been frequently made by one cartel member against another. The fixing of production quotas without the fixing of prices has proved an ineffective procedure. In periods of fairly good business the quotas were not observed; in the current period of acute depression the quotas have lost all significance. Actual production is considerably below the assigned quotas.

The European Aluminum Cartel, organized in 1926 by the producers of Great Britain, Germany, Switzerland, and France for a period of two years and later extended to the end of 1931, has failed to achieve its object of stabilizing or maintaining prices. Recent reports from Europe indicate that the cartel will not be renewed. The state of tariff warfare that has existed between Germany and Switzerland and the recent announcement that the commercial treaty between the two countries will not be renewed in 1932 point to the probable dissolution of the agreement. A special feature of the Aluminum Cartel is that it has had to face keen competition of the American aluminum interests which control about 50% of the world output, the other 50% being controlled by the cartel. Price maintenance under these conditions was difficult, and the cartel has been forced to reduce prices several times since its organization.

The outstanding cartel failure in 1931 was the breakdown of the negotiations to renew the one-year agreement concluded in August, 1931, between the European producers of synthetic nitrogen, organized in the Convention Europeene de l'Industrie de l'Azote, and the Chilean producers of natural nitrates, represented in the Compania Salitrera de Chile, controlling about 90% of the Chilean production. The cartel was organized in the midst of an acute and worldwide depression. The production capacity of the industry was about 4,000,000 tons, while the effective demand even in favorable times did not exceed 2,000,000 tons, and was estimated at only about 1,400,000 tons for the current year. An agreement on production quotas and division of world markets was an impossibility. The increase in production capacity in France and Belgium, where the industry is specially favored by the Government because of its importance to national defense, and in the Netherlands may be pointed out as a special factor in the breakdown of the agreement. The industry is threatened with a serious price war. The competitive strength of the Chilean producers of natural nitrates is by no means negligible. The existence of large stocks, accumulated during the past year because of failure to limit production in line with the world agreement, and the serious financial position of the Chilean Government, which is heavily interested in the industry, will tend to increase the pressure for a rapid liquidation of the excess supply of stocks and may lead to forced sales on the world market. It is reported, however, that conversations for some form of agreement are still going on, but their precise nature is not known. The formation of a financial community of interests—Interessengemeinschaft—or the establishment of a central world sales syndicate have been mentioned as possible solutions of the problem.

Failure of the Rayon Agreement

The European Rayon Cartel, organized in a loose form by the important viscose producers of Great Britain, Germany, and Italy,—Courtaulds, Vereinigte Glanzstoff, and Snia Viscosa—failed in 1929 to function smoothly. Overproduction and price cutting brought the rayon industry into a critical situation and gave rise to a series of secret negotiations for the strengthening of the cartel structure. The most important German, Dutch, Italian, and Swiss rayon producers, using the viscose process, signed an agreement in July, 1931, for the division of the German market. All sales will be made through a central syndicate—the Kunstseide-Verkaufsburo G.m.b.H. in Berlin. This agreement, it is expected, will be followed by similar arrangements among the non-viscose rayon producers. All the important world producers are more or less closely connected by means of working agreements or through financial participation, or through exchange of patents. Although there is no world rayon cartel, determination of prices no doubt is strongly influenced by formal or informal understandings. The chief obstacles to the establishment of a genuine international cartel lies in the lack of strong international organizations in France, Belgium and the United States, as well as in the fact that three different processes are used in the production of rayon.

The Sad Condition of Copper

A striking example of an unsuccessful cartel is the World Copper Cartel, organized in 1926 as a Webb-Pomerene corporation, by the copper producers of the United States, Belgian Kongo producers (Katanga), and the British Metals Corporation. The cartel was able to effect an increase in prices to a highly remunerative figure, but in the course of the current business depression all control of the market was completely lost, and prices declined to a record low figure. In spite of drastic curtailment stocks accumulated. A meeting of world copper producers was called in New York last November, but after several weeks of discussion no satisfactory agreement could be reached. The costs of production of the different copper producers vary so greatly that a universally acceptable program was impossible to devise. What the ultimate result of these negotiations will be is not yet known, but failure to reach some sort of agreement may prove to be fatal to the industry.

A number of cartels were formed or renewed in 1931—tin, lead, zinc, sugar, and platinum—and it is impossible yet to form an opinion about the results accomplished. They were organized under the pressure of unfavorable economic developments. So far no stabilization of prices has been accomplished. The control of production in the primary industries is easier than in a manufacturing industry producing a large variety of products. Limitation of production, however, is not a solution in itself. There must be a revival of demand to bring these industries out of their precarious situation.

This brief analysis of the operation of some of the outstanding international cartels suggests a number of conclusions:

1. With the exception of potash and platinum no cartel has been able to maintain prices in the face of adverse economic conditions.

2. The German-French Potash Cartel would not have been successful without drastic government interference with private enterprise. Government control is also an important factor in the Platinum Agreement.

3. In industries based on patents and secret processes, international cartels have been reasonably successful. A special factor in this situation is the unusually marked degree of financial concentration and intimate relations among the leading enterprises of the world.

4. Wherever the above-mentioned factors are not present—and that is true of by far the greater part of the industrial system of the world, cartel control has either completely broken down, or has existed only in theory without any tangible effect on the practical state of affairs, or has not even been attempted.

5. It should also be mentioned that the largest single industry in the world—agriculture—remains entirely outside the scope of cartel control and will necessarily remain largely outside that control, until man in his wisdom learns how to control the seasons of the year, the rainfall, and the winds.

6. No progress has yet been made in giving wider publicity to the character and provisions of international cartels. The secrecy that surrounds these cartels has been pointed out as a serious drawback by the International Economic Conference, held in 1927 in Geneva.

7. There is no body of international law or a system of international courts to consider and decide cartel disputes.

8. International cartels have not prevented the expansion of production capacity. Limitation of production without a strict limitation of production capacity leads ultimately to disaster.

A final remark, that is generally applicable, although not true in all specific cases, is that in periods of rising prices and booming business cartels are as ineffective in preventing price inflation as they are in preventing price deflation when the tide of business turns against the producers. The great aim of the cartels—their only *raison d'être*—a stable price level over a long period of time has not been achieved.

The production of metallic cadmium in the United States in 1930 amounted to 2,777,762 pounds, valued at $1,777,768, as reported by producers to the United States Bureau of Mines, Department of Commerce. This is the largest annual production on record and is 12 per cent higher than the output of 2,481,427 pounds in 1929, the previous record, which was 32 per cent higher than production in 1928. Sales of cadmium by domestic producers in 1930, however, amounted to only 1,664,644 pounds, 29 per cent lower than the sales of 2,330,617 pounds reported for 1929.

The average value reported by producers in 1930 was 64 cents a pound as compared with 81 cents a pound in 1929. Imports of cadmium dropped from 214,307 pounds, valued at $184,527, in 1929 to 40,105 pounds, valued at $27,915, in 1930.

There were eight producers of metallic cadmium in 1930, the American Smelting & Refining Co., Denver, Colo., Anaconda Copper Mining Co., Great Falls, Mont., Evans-Wallower Zinc Co., East St. Louis, Ill., Harshaw Chemical Co., Grasselli Chemical Co., Cleveland, Ohio, New Jersey Zinc Co., Palmerton, Pa., Sullivan Mining Co., Kellogg, Ida., and the U. S. Smelting, Refining & Mining Co., Midvale, Utah.

In addition to metallic cadmium, domestic manufacturers reported production of the following cadmium compounds in 1930: Cadmium sulphide, cadmium sulphate, cadmium hydrate, cadmium oxide, cadmium chloride, cadmium carbonate, cadmium lithopone and cadmium selenide. The estimated cadmium content of cadmium compounds produced was 316,300 pounds, valued at $323,718, in 1930, compared with 433,300 pounds, valued at $498,734, in 1929.

We Congratulate---

Dr. George Simon, March 2, 1872
J. H. D. Rodier, March 8, 1862
Charles C. Concannon, March 13, 1889

In 1900 Dr. George Simon came to this country from Germany as the agent for the Chemische Fabrik von Heyden and organized the American branch with a capitalization of a modest $10,000.

Today that sum is now in round figures nearly $2,000,000 and the company is operating two large modern plants engaged in the production of a very full list of fine chemicals. The path was not a smooth one, the war period and the years immediately following were full of unpleasantness but Dr. Simon has by dint of his personal charm and ability won for himself a special niche in the affections of both competitor and customer alike. As vice-president of the Heyden Chemical Corporation he has given unsparingly of his time and devotion to his company's interests and finds little time for outside interests other than a little golf and horseback riding. At conventions early risers may often find he and Mrs. Simon enjoying a canter before breakfast.

After forty years of the most active kind of service with the Grasselli Chemical Company, J. H. D. Rodier retired two years ago. During these two score years he came from office manager of the small Beavers Falls Works to vice-president and sales manager of the Company. Along the way he made more warm friends than most of us have nodding acquaintances. We join those friends in this assurance that he is not forgotten in the fields where he so long and so successfully labored and from which ill health forced him to withdraw. May his seventieth birthday be the turning point that will bring back again to more active life and a vacation this summer at his camp on the North Shore of Lake Superior.

We congratulate Charles C. Concannon particularly on the wealth of statistical material that is now made available generally to the industry by the Chemical Division of the Bureau of Foreign and Domestic Commerce. As Chief he has brought the Division to a high state of efficiency and its usefulness is not only demonstrated but appreciated. He is of the industry and therefore understands its needs. He has been responsible not alone for the decided improvement in the volume and value of statistical matter, but in actually b r i n g i n g buyer and seller closer together in many diverse ways. In view of a certain famous typographical error the less we say about Mr. Concannon's hobbies, the better. May the chemical industry continue for a long time to benefit by his helpfulness and understanding.

Tomorrow's Chemical Demand

By Williams Haynes

IT IS an expensive business to shut down a chemical plant. Even to curtail operation runs up the curve of costs at an alarming rate.

Chemical demand is an industrial demand, and when the consuming industries close down or cut down the chemical producer is as helpless as a babe. There is little that he can do directly to stimulate sales.

It follows naturally that chemical prices drop quickly and deeply in an effort to strike the balance between a well fixed supply and an inflexible demand that responds very little to lower costs. Accordingly, the chemical industries are peculiarly vulnerable in a period of depression. Like other suppliers of raw materials, the chemical manufacturers have borne a bit more than their fair share of the shock of our present universal readjustment.

Moreover, even with the recovery of business there is not apt to be a rebound of chemical prices. Market history says very plainly that the course of chemical prices is continuously downwards and that it is a difficult and unusual feat to restore chemical prices to former, higher levels. A war, or some technological revolution, either of which might create a new and utterly abnormal demand, could accomplish this economic miracle. But even the regular course of chemical business, is going to depend chiefly upon the character and intensity of the chemical demand of tomorrow.

Chemical Consumption Figures

Our American industries with their technique of mass production pour into their furnaces and crushers, their vats and autoclaves enormous tonnages of raw materials. The statistics of consumption look like astronomical data. Of pulpwood 7,645,011 cords to make paper; 1,039,921,589 barrels of crude petroleum for gasoline and lubricants; 3,524,682 gallons of ethyl alcohol in the manufacture of rayon; 2,294,-183 tons of sulfuric acid to make fertilizers; 6,346,363 tons of salt consumed in our chemical industries; 76,758,958 tons of coal coked; 104,712,586 gallons of vegetable oils in our soaps. These are but a single year's consumption in the United States. The world's consumption of metals (one of the few materials for which there are approximately correct international statistics) has been estimated by Dean Theodore J. Hoover of Stanford School of Engineering to be in excess of a billion tons a year, which reduces to the astonishing figure of a thousand pounds every twelve month for each man, woman, and child on the surface of the globe.

Such staggering arrays of digets delight the scientists and economists who decorate the Sunday newspapers with terrifying forecasts of all the dreadful things that will happen to the poor human race when this or that vital raw material vanishes. Such calamities may come. The end of our supplies of wood, of coal, of crude oil, of tin, have all been so often and so carefully estimated that even the most cheerful optimist must admit the dire possibility but it is not more than a possibility. First, there is always the counterbalancing possibility of discovering new sources of supply. Second, there is the probability of perfecting methods and processes that will make it possible to utilize low grade supplies. Third, any serious threat of a shortage would advance prices and curtail consumption. Higher prices would also make it practical to work low-grade material now wasted and would also promote the use of substitutes. All these perfectly natural economic processes would come to work postponing the evil day of exhaustion.

Wood No Longer A Necessity

Wood is a particular pet of the Cassandras who prophesy the end of industrial civilization. The forests of the world are melting away. The uses of wood are many, and the croaking forecasters are at pains to point out that a single Sunday issue of one of our large metropolitan newspapers gobbles up from five to seven acres of virgin puplwood timberland. Reforestation lags behind consumption. The end of our wood supply is, they declare, plainly in sight. Grant that it is, and let us face the facts.

Dr. John E. Teeple did so and scrutinizing the uses of wood discovered that it has ceased long since to be a necessity either as a fuel or a construction material, for furniture or for charcoal. Its chemical use as a source of methanol, acetic acid, and acetone has already been largely replaced by synthesis and could be entirely replaced without the least inconvenience to chemical operations. Its use as raw material for making newsprint paper and near-silk garments would present a more serious difficulty, and these industries would be forced to use annual instead of perennial cellulose. Such a switch might be a bother, but it is not an impossibility. Dr. Teeple's conclusion was: "Just one industry I can find where the disappearance

of wood might be a horrible calamity and might cause a considerable change in the trend of our modern civilization. I cannot see how the manufacture of antique furniture could continue without wood."

This witty inference is true. It holds good for many of our most cherished raw materials. If we but take the time to set down their so-called essential uses we usually find that already we have a substitute or the plain indication as to ways and means of providing a substitute.

The Place of Hydrogenation

The brown coal that underlies Rhode Island is not the rich anthracite of Pennsylvania. An oil shale deposit is not the facile oil gusher. But the hydrogenation process that won for Frederick Bergius the 1932 Nobel Prize in Chemistry is a guarantee of our future supply of fuel, of lubricants, of all sorts of hydrocarbon raw materials from these now despised poor relations of coal and petroleum.

Our enormous consumption of copper in electrical transmission wiring has gravely concerned the exhaustionists. Already this use of copper is being replaced by the lighter, cheaper aluminum. Aluminum is the most abundant of all metals; but if the present vast supplies were to be dangerously depleted, we know of whole mountain ranges of rocks that contain 25 per cent. of aluminum. We do not now know how profitably to extract this metal from these ores; but only a very torpid imagination can fail to see that, should the necessity arise, higher prices would be incentive enough to find a way to tap these resources.

Of all man's great discoveries and inventions, fire and the wheel stand first, the prototypes of our chemical and mechanical tools. Each have served man well, making life more safe and comfortable. Both have been indispensable to our material progress; but chemicals have made a distinctive contribution in furnishing us with new and useful materials. Celluloid, aspirin, coal-tar dyes, rayon, bakelite, lacquer are after all but modern, scientific representatives of the same group of synthetic materials that trace back to bronze and glass. These ancient chemical products have so long replaced natural products that we have almost forgotten their synthetic origin and we seldom think of the materials they surplanted. The "Bronze Age" recalls one of the first great chemical substitutions, alloys for chipped or polished stone. Metallurgy is probably the oldest of our chemical process industries; but glass making is quite old enough to have lost its origin in myth.

In these ways chemistry will conserve raw materials by discovering better ways of using our cheaper, more common commodities and by teaching how to extend the supplies of those that are becoming scarce and dear. Moreover, this negative conservation will be ably helped by the positive saving of irreplacable supplies. This is the "Creative Chemistry" that gave its title to Dr. Slosson's book. It is the industrial chemistry of the future; the chemistry whose processes are already beginning to usurp power processes; it is the chemistry that serves mankind, not only by saving time and effort, but also by saving foodstuffs, metals, and other essential raw materials. It is the chemistry of that chemical industry which, in the coming chemical era of industry, will control if it does not eventually dominate economic organization.

This is a pleasing prospect for the chemical industries. Their future is predicated upon two plain, basic, admitted economic facts. Population continues to grow and man's material wants multiply. Our chemical markets of the future are going to be greater and broader. We can confidently expect new chemical products and new uses for old chemicals. The way to profits lies along the course of greater chemical demands rather than higher chemical prices.

Association News

Interest centered during the month in preparations for the seventh annual dinner of the Drug and Chemical Section of the N. Y. Board of Trade which is to take place March 15, at the Hotel Commodore. Over 500 reservations are now in the hands of the Secretary of the Section and, plans formulated at a preliminary dinner held Feb. 9 at the Commodore by the Committee in charge are expected to raise this figure to well over a thousand. The dinner is no longer considered as a strictly local affair and men of the industry from all over the country will be in attendance. Tickets may be secured from the secretary, Ray C. Schlotterer, 41 Park Row, N. Y. City, Cortlandt 7-1414.

More than 1,000 chemists and executives are expected to assemble in New Orleans, March 28 to April 1 for 83rd meeting of the A. C. S.

A symposium of oil experts under the chairmanship of Dr. R. T. Haslam, vice-president, Standard Oil Development, will feature the convention. Among those who will deliver addresses on the general theme of "Chemical Engineering Processes in the Oil Industry" are: Dr. Merrell R. Fenske, Pennsylvania State College; Alfred Fisher, Jacque C. Morrell, and Gustav Egloff, Universal Oil Products, Chicago; Dr. Warren K. Lewis, M. I. T.; Charles Allen Thomas and William H. Carmody, Thomas & Hochwalt Laboratories, Inc., Dayton, O.; J. B. Maxwell, Standard Oil Development; S. N. Obryadchikoff and W. A. Peters, Jr., E. B. Badger & Sons, New York.

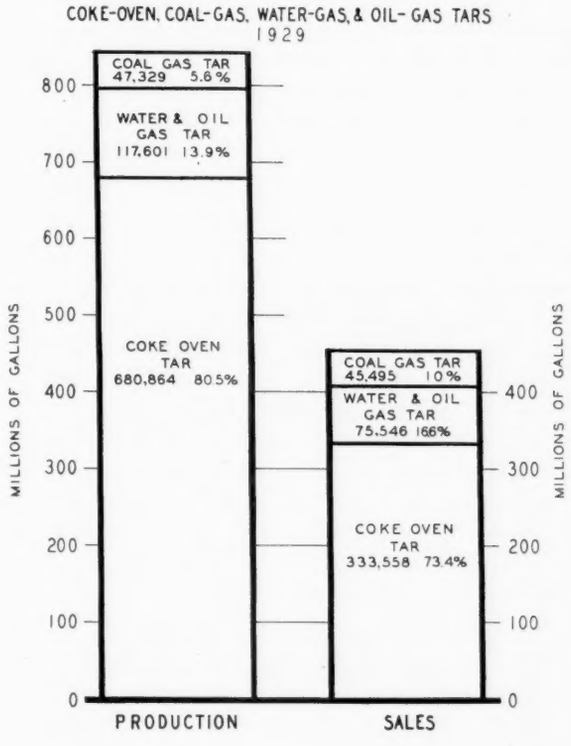
Division of Industrial and Engineering Chemistry, of which Prof. D. B. Keyes, University of Plinois is chairman, is sponsoring the oil symposium, in which the Division of Petroleum Chemistry, Cary R. Wagner, chief chemist of Pure Oil, Chicago, chairman, and Division of Gas and Fuel Chemistry, J. D. Davis, research chemist of the U. S. Bureau of Mines, chairman, will collaborate. The Division of Physical and Inorganic Chemistry, under the chairmanship of Prof. H. H. Willard of the University of Michigan, in addition to a joint symposium on "Adsorption" with the Division of Colloid Chemistry, headed by E. O. Kraemer, research chemist, du Pont, will hold two half-day sessions.

Representatives of the Chicago Section of the A. C. S. and of the Chicago Chemists Club signed agreements by which both groups will in the future hold their meetings in the Midland Club. In addition, the Chicago Chemists Club signed a lease for quarters considerably larger than it has previously occupied in the Midland Building, 176 West Adams St.

G. MacIntosh, chemical specialist for Moody's Investors Service reviews the potential competitive position of high temperature carbonization versus low temperature carbonization and summarizes production figures

Coal, Coke and Crudes

HIGH temperature carbonization of bituminous coal yields of coke, 72 per cent; gas, 22 per cent; and tar, 6 per cent. Using about 15 per cent of this country's soft coal production, the by-product coke industry has a material bearing upon three of the nation's basic industries: coal, steel, and chemicals. The major portion of coal-tar comes from by-product ovens, with a lesser, but none the less important amount, from the manufacture of coal-gas and water and oil gas.



A potential competitor to the by-product coke industry is the low temperature carbonization process whose advantages are high yields of creosote oil, with consequent larger recovery of tar acids, and its valuable light oils with promising anti-knock constituents. Although carried on with some success abroad this process had not as yet been satisfactorily proved in this country. Unforeseen technical difficulties in coking American coal, inability to produce a solid fuel without briquetting or to market tar at a price much above its value as a fuel, have proved obstacles. While a number of experiments, commercial and otherwise, have been made in this country, interest has centered on the International Combustion Engineering Corporation plant at New Brunswick, N. J. This venture has not proved commercially feasible. However, the economic feasibility of low temperature carbonization appears but a matter of time, and announcement has recently been made that the Koppers Company has developed a low temperature process, the actual use of which awaits only improvement in general business.

Coke production was formerly chiefly carried on in beehive ovens where the by-products are not recovered. During the war the amount of coke produced from by-product ovens first exceeded beehive production and in recent years the trend has continued.

By-product coke plants have an annual capacity of over 91,000,000 tons of bituminous coal, capable of producing approximately 64,000,000 tons of coke. In 1930 production of by-product coke was about 15 per cent below the record year 1929 and in 1931 production was 29 per cent below 1930 and 40 per cent below 1929. This decline is not amazing when we consider that about 75 per cent of by-product ovens are connected with iron furnaces. Thus about three-quarters of by-product coke is used in the manufacture of pig iron and ferro alloys, the balance being consumed in the production of water-gas, in

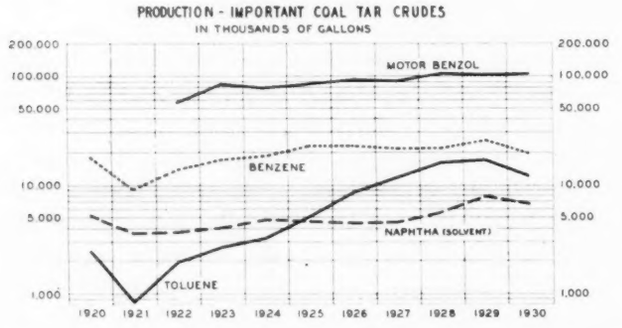
foundries, in smelting non-ferrous metals, for domestic heating and other purposes.

Production of By-Product & Beehive Coke
(Thousands of Net Tons)

	By-Product	*Beehive*	*% By-Product*
1913	12,715	33,585	27.5
1920	30,834	20,511	60.0
1921	19,750	5,838	78.1
1922	28,551	8,573	76.9
1923	37,598	19,380	66.0
1924	33,983	9,668	77.8
1925	39,912	11,355	77.9
1926	44,377	12,489	78.0
1927	43,885	7,207	85.9
1928	48,313	4,493	91.5
1929	53,412	6,472	89.2
1930	45,196	2,776	94.2
1931	32,455	1,274	96.2

The itemized tabulation given in Figure II gives the relative importance of by-product coke, gas, and coal-tar crudes. The value of output other than coke, gas and ammonia seems large, but further processing into intermediate and finished products adds greatly to the value of such important crudes as benzol, toluol, naptha, etc.

Figure II



By-Product Coke, Gas and Coal Tar Crude Statistics—1930
(000's omitted)

	Unit	*Production*	*Sales Quantity*	*Value*
Coke	Ton	45,196	.....	.....
Gas	M Cu. Feet			
Through city mains			164,690	$48,939
Used in steel or related plants	(a)	724,103	231,233	24,904
Sold for industrial use			25,787	4,266
Used under boilers, etc.			20,409	1,185
Tar	Gal.	602,485	314,865	15,563
Ammonia				
Sulfate	lb.	1,341,920	1,310,588	20,449
Ammonia Liquor (N H3 content)	lb.	49,031	45,368	2,236
Light Oil & Derivatives				
Crude Light Oil	Gal. (b)	178,326	9,942	984
Benzol, crude & refined	"	19,143	19,187	3,377
Motor Benzol	"	101,863	102,573	14,427
Toluol, Crude & refined	"	11,833	12,083	3,614
Solvent Naphtha	"	4,078	3,648	651
Xylol	"	2,040	1,892	482
Other products	"	6,476	1,983	120
Napthalene, crude & refined	lb.	12,640	13,029	161
Tar Derivatives				
Creosote Oil	Gal.	29,237	28,571	2,500
Phenol, crude	"	137	105	38
Pitch of tar	Tons	106	7	47
Other derivatives	"	....	....	55
Other products	"	....	....	95

(a) Includes gas wasted and gas used for heating retorts.
(b) Of which 173,328,000 gal. were refined on premises to make light oil derivatives shown.

Production of coal-tar crudes by firms not primarily engaged in the operation of coke ovens was valued at $36,000,000 in 1930, mainly creosote oil, refined tar, pitch of tar, and light oils.

Only about 50 per cent of coke oven tar production is refined. The balance is utilized as fuel mostly in the operation of open-hearth furnaces because it is more valuable to burn than to sell. However, the present trend is to get some value out of the tar before using it as a fuel, and numerous coke plants are now subjecting the tar to partial distillation.

Production of Coke Oven Tar
(000's omitted)

	Gallons	*Per Cent Sold*
1920	360,664	47.8
1921	253,052	53.6
1922	227,780	49.6
1923	440,907	48.0
1924	422,074	49.7
1925	480,849	49.9
1926	529,486	52.4
1927	546,859	55.9
1928	631,845	52.6
1929	680,864	49.0
1930	602,486	*52.3

*About 48.2% went for refining into tar products, the balance sold as fuel.

A higher percentage of coal-gas tar is refined if we include this with coke oven tar, the amount distilled in 1930 was 63 per cent of the combined total production.

Important quantities of tar are used for road construction. Here it competes with asphalt, a derivative of petroleum refining. Two well-known trade-marked products in this field are "Tarvia" of Allied Chemical and "Tarmac" of Koppers. Large amounts of tar pitch derived from by-product coke ovens are used for roofing, in the production of shingles, tar paper and allied products. The production of refined tar, used largely in the manufacture of tar paper and roofing felts, increased from 2,421,000 barrels in 1929 to 2,565,000 barrels in 1930.

Ammonia is another important item of by-product coke production. Most of the ammonia thus produced is converted into ammonium sulfate, widely used fertilizer ingredient. Production of sulfate from by-product coke ovens throughout the world, in the year ended June 30, 1931, amounted to 21 per cent of nitrogen output. Profits from ammonium sulfate production to the by-products coke industry have declined greatly in the past year as a result of the world overproduction of nitrogen and the shrunken demand for fertilizer. The price of ammonium sulfate has declined practically 50 per cent and it is now quoted around $18 per ton as compared with $34 per ton for Chilean nitrate of soda, whose nitrogen content is actually smaller.

Creosote oils constitute about one-half of the products obtained in distilling and refining tar. The total production of coal-tar creosote in 1930 was 122,600,000 gallons of which firms not primarily engaged in the operation of coke ovens or gas houses produced 96,900,000 gallons or 79 per cent. Creosote oil is used chiefly in the preservation of wood competing with petroleum, zinc chloride, and others.

The importance of the wood preservation industry is attested by the 1929 value of its products, which totaled over $190,000,000. Conditions in this business were particularly poor in 1931 and thus far in 1932 owing to the severe curtailment of maintenance expenditures by railroads. Crossties normally constitute more than 60 per cent of chemically treated wood. Telephone, telegraph and other poles make up over 20 per cent, with construction timber, miscellaneous lumber, posts, shingles etc. consuming the balance.

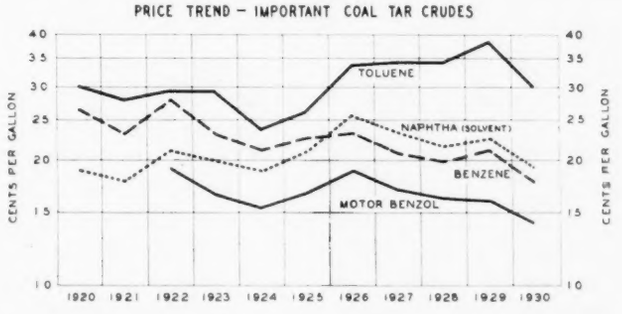
This country, until recently, was greatly dependent upon foreign sources for its creosote oil requirements but is now more than capable of meeting domestic demands. We may anticipate a sharp downward trend of imports, which come chiefly from Great Britain, the Netherlands and Belgium.

Creosote Oil
(000's omitted)

	Production (Gallons)	*Value*	*Value Per Gallon*	*Imports (Gallons)*	*Value*	*Value Per Gallon*
1928	126,779	$16,507	13.0c	88,385	$13,928	15.8c
1929	127,750	15,279	12.0c	79,301	10,119	12.8c
1930	122,572	13,299	10.7c	66,922	7,806	11.7c
1931	...	...	...	36,885	3,598	9.8c

Benzene or benzol is the most important coal tar crude from the chemical industry's viewpoint. It is the basic material for many intermediates, chlorobenzene, aniline, synthetic phenol and nitrobenzene and ultimately entering into a diverse line of finished coal-tar products. Although of great value in the production of a varied number of intermediates and finished products, the most important use of benzene, from the aspect of dollar sales, is its employment as a motor fuel, since it may be blended with gasolene to form a powerful anti-knock fuel. Here it has met considerable competition, in recent years, from ethyl fluid. A potential competitor of importance in this field is an anti-knock compound which may possibly be produced from methane, in turn derived from natural gas. This project, however, is still in the development stage. A large percentage of motor benzol production is exported to foreign countries, particularly Great Britain and Germany. Over 70 per cent of our exports in 1930 were taken by Germany, which, however, placed a high import duty on this

Figure III



product in 1930. Mainly as a reflection of this action our total exports of benzol declined greatly in 1931; from 44,600,000 gallons (at 21.5c per gallon) in 1930 to 21,861,000 gallons (at 17.3c per gallon) last year. Hence we may logically expect a continued downtrend in benzene prices over the next few years. At this time mention should also be given of the possibilities of synthetic benzene from natural gas and by-product gases of the petroleum industry.

Naptha is obtainable in several grades, such as crude heavy naphtha and solvent naphtha. The naphthas are used to make synthetic resins, and as solvents for paints, lacquers, enamels, asphalts, cleansing compositions, rubber cements and naphtha soap.

Naphthalene, also known as tar camphor or white tar, is the starting material for a wide series of dyestuffs and intermediates. It is also used as a solvent for rubber, wood preserving compounds, for mothproofing, as a substitute for camphor, in lubricating compounds and a number of organic syntheses.

Total Commercial Naphthalene Production
(000's omitted)

	Pounds	*Value*	*Value Per lb.*	*Crude Imports lbs.*
1920	42,602	1,343	3.1c	15,012
1921	19,433	463	2.4	4,496
1922	25,411	536	2.1	3,144
1923	53,814	934	1.7	20,992
1924	44,103	603	1.4	5,267
1925	45,302	652	1.4	1,980
1926	53,059	594	1.1	6,963
1927	53,177	558	1.1	6,577
1928	46,157	531	1.2	19,926
1929	39,201	688	1.8	35,007
1930	31,676	467	1.5	27,667

Toluene or toluol is produced in the same manner as benzene from coal-tar and like it is an important base for a large line of intermediates in the dyestuffs industry. It is also used in production of pharmaceutical compounds, synthetic perfumes, T N T, saccharine, as a solvent for lacquers, varnishes and dopes, as a dry cleaning agent etc. Xylene (Xylol) another distillate of crude tar enters into the manufacture of organic compounds, dyestuffs, as a solvent in making rubber cements, lacquers and varnishes, and used to wash naphthalene from illuminating gas.

Coal tar crudes are allowed to enter the United States duty free, but excluding creosote oil, imports are not of great significance.

On distillation tar yields two general groups of products (1) complex fractional distillates commercially designed as light oil, creosote oil, solvent naphtha and anthracene oil; (2) coal-crudes, such as benzene, toluene, naphthalene, anthracene, the creosols, etc. After purification these crudes are used in the manufacture of coal tar intermediates, which in turn are used in the preparation of finished coal tar chemicals, and directly as rubber accelerators. From fewer than ten coal-tar crudes some 300 intermediates are prepared for use in the production of hundreds, of dyes, medicinals, flavors, perfumes, resins, and other finished coal-tar products.*

*Part II will deal with intermediates and finished coal-tar chemicals.

The Place of Sulfonated Fatty Alcohols In Industry*

By M. Briscoe, B. Sc.[1]

THE value of the sulfonated fatty alcohols had been very adequately studied in the laboratory and the supreme merits of the products demonstrated before it was commercially possible to produce the fatty alcohols on a large scale.

The disadvantages of soap are very marked. It does not stand up against acid, for in an acid bath the free fatty acid of the soap is liberated, and as this free fatty acid is not soluble in water it has no scouring or textile value. Soap, moreover, cannot be used in sea water; neither will it stand up to ordinary hard waters. With such waters, calcium and magnesium salts of the fatty acids are formed and are insoluble. These "lime soaps" are somewhat sticky and glutinous and contaminate cleaning processes, giving trouble in dyeing, bleaching and finishing. As derivatives of the free fatty acids the soaps are also liable to turn rancid, any lime soaps left in the fabric resulting in a disagreeable smell. The uneven fixing of such lime soaps in the fibres of the material after scouring makes subsequent even dyeing a difficult problem, and white fabrics, in particular, may go greyish or yellowish.

Introduction of Sulfonated Oils

The earliest attempt to overcome the disadvantage of soap was taken in the direction of producing sulfonated oils. Those still used in commerce are of the Turkey Red oil type, and consist of castor oil or some similar oil rendered soluble by treatment with sulfuric acid. A typical example is that of ricinoleic acid. The early sulfonated oil of commerce was the sodium salt of this body, and was certainly an improvement in some respects on soap. The free acid as liberated in acid solution was water soluble, whilst the oil itself was not so readily affected by hard water because the calcium salts were relatively soluble in water. For many purposes, therefore, these sulfonated oils replaced soap, particularly in the finishing section of the textile trade. As general substitutes for soap, however, they could not really be regarded seriously, for their wetting-out powers, emulsifying properties and lathering and cleansing actions were poor.

The problem of producing more effective bodies than soap was then tackled on two separate lines. Attempts were made to evolve bodies on entirely different basis with entirely different chemical structure, e. g., the alkyl naphthalene sulfonic acids. These were very valuable for certain purposes and some of the members of this group had remarkable wetting-out powers, but they had no real "soap" properties. The sulfonated oils themselves were also studied very deeply with a view to modification in structure. The conclusion was reached by one group of research workers that it is really the COOH-group which is responsible for the relative want of resistance to lime salts, and early attempts were therefore made to modify the COOH group. One such attempt consisted in first making butyl ester of ricinoleic acid and sulfonating this so that the group contained COO-(C_4H_9); another attempt converted the COOH group into the acid amide group $CONH_2$.

These modified sulfonated oils possessed remarkable wetting-out properties, great resistance to acids and salts, but no cleansing or emulsifying properties at all comparable with soap. They were also somewhat sensitive to alkalis. Workers in this field finally reached the conclusion that success was only likely to be achieved by the complete elimination of the COOH-group.

If one looks at the formula for a typical sulfonated oil such as ricinoleic acid, $CH_3(CH_2)_5.CH(OH).CH_2.CH{:}CH.(CH_2)_7.CO_2H$, it is readily seen that the elimination of the COOH-group would leave an alkyl sulfuric acid ester. It is therefore obvious that to produce an alkyl sulfuric acid ester one must start initially, not with a fatty acid, but with a fatty alcohol whereby the OH-group so typical of alcohols can be esterified in the more or less usual manner:

$$C_nH_{(2n+1)}OH \qquad C_nH_{(2n+1)}OSO_2OH$$

Such alkyl sulfuric acid esters were prepared in the laboratory, their properties studied in detail, and it

*Abstract of Paper delivered before Huddersfield Section of the Society of Dyers and Colourists.

[1]Ronsheim and Moore, associated with Deutsche Hydrierwerke.

was found that they fulfilled all expectations. These products, here regarded as sulfonated fatty alcohols, have excellent wetting-out powers, far surpassing those of soap and the sulfonated oils, excellent emulsifying properties, adequate stability to acid solutions as the free acids are soluble in water, and complete stability to alkalis. They do not separate any alkali hydrolytically, thus giving if required a completely neutral solution. They are also completely resistant to sea water and to hard waters, as the calcium and magnesium salts are absolutely soluble; have pronounced "fatty" characters; but are free from rancidity on storage so that there is no possibility of deterioration.

In view of these properties it was obvious that a ready market was awaiting the sulfonated fatty alcohols. The problem, therefore, became one of producing the fatty alcohols in bulk at reasonable prices, and this work was taken in hand by the Deutsche Hydrierwerke A. G., Berlin-Charlottenburg, under the leadership of Professor Dr. W. Schrauth. The classical laboratory method of producing saturated fatty alcohols by the reduction of the ethyl ester of the corresponding fatty acid with metallic sodium and alcohol, however, was obviously an impossible process for bulk production. The process of reduction had to be simplified, whilst the raw materials used had to be naturally occurring products and not products which in themselves have to be synthesised first or else extracted with difficulty from natural products. This work was completely successful, for it was found possible by using a process of catalytic hydrogenation at high pressures to produce the fatty alcohols not merely from artificially prepared esters of the corresponding fatty acids, but also from naturally occurring esters such as the glyceryl esters (i. e., the fats from natural waxes, etc.) and from the free fatty acids themselves. This work was commenced in the laboratories of the Deutsche Hydrierwerke A. G. in 1927.

Properties of "Lorol"

Lorol technical is the name given to the mixture of saturated fatty alcohols derived from the hydrogenation of cocoanut oil, or the free fatty acids of cocoanut oil. All the even-numbered saturated fatty alcohols from C_6 to C_{18} are present, but the main constituent is the C_{12} alcohol known as lauryl or dodecyl. The C_{12} alcohol comprises some 60 per cent of the total alcohol mixture, the remainder consists almost entirely of the even-number saturated alcohols below and above C_{12}. This product is liquid at summer temperature. Lanette wax (stearine alcohol) is a solid white wax-like material which is a mixture of hexadecyl or cetyl alcohol (C_{16}) and octadecyl or stearyl alcohol (C_{18}), which can be obtained by the hydrogenation of commercial stearine. By fractional distillation it is possible to separate these technical mixtures into the individually pure alcohols, for which a market exists in the perfumery trade.

Not satisfied with producing the saturated fatty alcohols alone the Deutsche Hydrierwerke A. G. turned their attention to producing unsaturated fatty alcohols. Under the name of Ocenol there is now available an unsaturated fatty alcohol, known in Germany as olein alcohol. This is the alcohol corresponding to oleic acid. It is related to stearyl alcohol exactly as is oleic acid to stearic acid.

Manufacture of Additional Alcohols

In one process sulfuric acid in the presence of acetic anhydride is used at 100° C.: in another, chlorsulfonic acid is used at 30° C.; in a third, fuming sulfuric acid is employed. The first and second of these methods yield an alkyl sulfuric acid ester, that is, one with the OSO_2OH group. The third method gives a true sulfonic acid with the SO_2OH group. The alkyl sulfuric acid esters are much more easily prepared, and on the whole they are the better products. The sulfonation of the unsaturated fatty alcohols such as Ocenol presented considerably greater difficulties but by means of suitable temperature control at very low temperatures it has been possible to prepare the sulfuric acid ester of this material. The products which come on the markets are the sodium salts of the sulfuric acid esters,

$$C_nH_{(2n+1)}OSO_2ON_a$$

in various physical forms and concentrations.

Amongst the sulfonated saturated fatty alcohols the wetting-out and penetrating properties in the cold are greatest round about C_{12} and decrease slowly as we approach C_{18}. On the other hand the detergent and cleansing powers increase slightly, as does the "fatty" characters of the body, with an increasing number of carbon atoms. Resistance to lime salts decreases slightly with increasing number of carbon atoms, but even at C_{18} it is quite ample. For general purposes, sulfonated Lorol is the best; the sulfonated Lanette wax is mainly used for finishing and avivage purposes. Sulfonated Ocenol naturally does not conform with the graduated properties of the saturated group. It has excellent wetting-out properties, a very enhanced calcium resisting power, fine cleansing powers and extra good "fatty" characteristics.

A considerable amount of work has appeared in German textile and chemical journals on the special uses of sulfonated fatty alcohols in the textile industry. In wool dyeing, for instance, a small quantity of sulfonated alcohol (½ per cent) added to the dye bath gives a finer degree of penetration. If wool is not too dirty it is even possible to scour and dye in the same bath. The sulfonated alcohols are also extremely useful in acid dyeing, chroming, chrome liquoring, vat dyeing, etc. They are valuable in

milling, as they give a soft and full handle; they can also be used to help in the felting of wool. In wool washing their emulsifying power is so great that they can completely remove all the ordinary wool greases and waxes. They do not, however, completely de-fat the wool, but in a rather remarkable way the extracted wool greases are replaced by a film of the sulfonated fatty alcohol. As the sulfonated fatty alcohols, contrary to natural wool fats, cannot become rancid, this is also a valuable property.

Whilst the fatty alcohols were originally produced with an eye to their sulfonation, it has since been found that they, themselves, possess valuable properties and are already being used by consumers in very considerable quantities. It has been found, for instance, that Lanette wax, that is to say the technical mixture of C_{16} and C_{18} alcohols, in conjunction with soap, can be used to make paraffin-wax emulsions for waterproofing. The Deutsche Hydrierwerke A. G., however, have prepared a specially treated form of Lanette wax, namely, Lanette wax "U", which disposes of the use of soap and makes direct emulsification of the Lanette wax and water possible. For certain finishing and avivage purposes Lanette wax and paraffin emulsions are also being used as well as Lanette wax and olive oil or cocoanut oil emulsions. Such emulsions give the filament a soft pliable feel, specially in the case of artificial silk mixtures.

Official German Potash Statistics

According to official statistics for 1930, reported by the Dept. of Commerce's Berlin commercial attache, 62 plants or, 2 less than in the previous year, operated in Germany for production of potash and rock salt. Potash salts and by-products were produced by 51 plants, of which 11 also produced rock salt. Rock salt was the exclusive product of the remaining 11 plants. The number of shafts in operation for potash-salt production totaled 55, as against 60 in the previous year.

German output of potash salts in 1930 amounted to 11,960,000 metric tons, as compared with 13,320,000 in 1929—a decline of approximately 10%. Up to May, 1930, production was somewhat higher than in the corresponding months of the previous year, but fell off in the remaining months.

The table below shows production of potash salts in recent years.

Year	Total potash salts		Including carnallite salts in per cent of—	
	Actual quantity Thousand tons	K_2O contents Thousand tons	Actual quantity	K_2O contents
1924	8,101	....	35.2	....
1926	9,408	1,263	19.8	14.4
1928	12,489	1,691	16.5	11.9
1929	13,316	2,318	17.4	12.5
1930	11,962	1,609	15.6	11.1

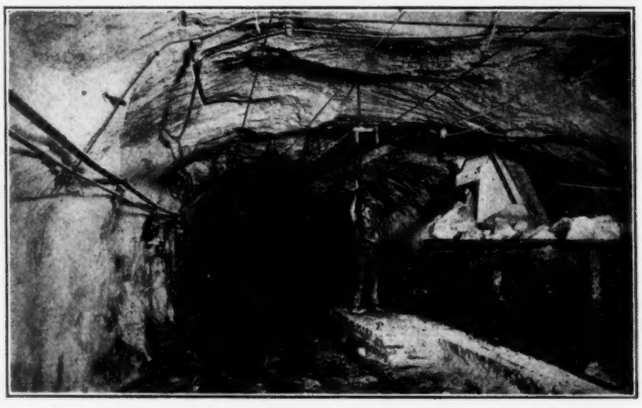
The share of carnallite salts in the total production did not decline, after the rationalization and reorganization programs of the potash industry had been put into effect in 1927, until 1930. This decrease was due chiefly to the developments in the Magdeburg potash district, which is the richest in carnallite salts. Output of all salts, as well as the share of carnallite salts in this area, declined during 1930. Whereas in 1929 the share of carnallite salts had been more than 68% of the total output, it amounted to only 63% in 1930. In the Halle district the share of carnallite salts amounted to almost 34% and in the Eisenach and Hannover districts about 8% each. No carnallite salts were produced in other districts.

A typical German potash mine above ground and below a "gallery" in the Stassfurt section

More than 80% of the raw salts were handled in potassium chloride factories; remainder was sold direct. Total production of salable potash salts in 1930 amounted to 4,530,000 tons, with K_2O content of 1,380,000 tons. In addition, there was a quantity of 458,000 tons of salable by-products. All groups, with the exception of the poorer salts, containing 12 to 15% K_2O, and the fertilizer salts, with 18 to 22% K_2O, were affected by the downward trend. The actual potash content of the total production, therefore, declined from 31.4% in 1929 to 30.5% in 1930. The depreciation of production of salable potash salts in thousands of tons was as follows: Carnallite and raw salts, from 1,680 to 231; fertilizer salts, 2,059 to 734; potassium chloride, 497 to 283; potassium sulfate, 230 to 115; and potassium magnesium sulfate, 66 to 18.

Nearly 70% of all salable carnallite salts and nearly 60% of all salable raw salts (containing 12 to 15% K_2O) were produced in the northern districts of Magdeburg and Hanover. The chief production districts for potassium chloride were Hanover and Nordhausen, which each produced approximately 40% of this high-grade salt. Approximately 58% of the production of potassium sulfate originated in the Eisenach district.

Sales of potash salts showed only a slight decline, which was almost equally divided between foreign and domestic sales. The total sales amounted to 4,440,000 tons, as against 4,570,000 in 1929, with a K_2O content of 1,360,000 tons, as compared with 1,400,000 in 1929. The K_2O content of foreign sales amounted to 38% of total potash sales, as against 39% in the previous year.



Monsanto Chemicals

are made by

MERRIMAC CHEMICAL COMPANY INC.
Boston, Mass.

RUBBER SERVICE LABORATORIES CO. Inc.
AKRON, OHIO

MONSANTO CHEMICAL WORKS, LTD.
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Monsanto Chemical Works
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CHEMICALS OF QUALITY
Monsanto
ST. LOUIS, U.S.A.

CHEMICAL

Photographic Record

Keystone-Underwood

Prof. Oskar Eckstein of Berlin, adviser of the German Potash Syndicate, at the White House on Feb. 13 to see President Hoover. He was accompanied by Herr Friedrich W. Von Prittwitz und Gaffron, German Ambassador to the U. S.

Keystone-Underwood

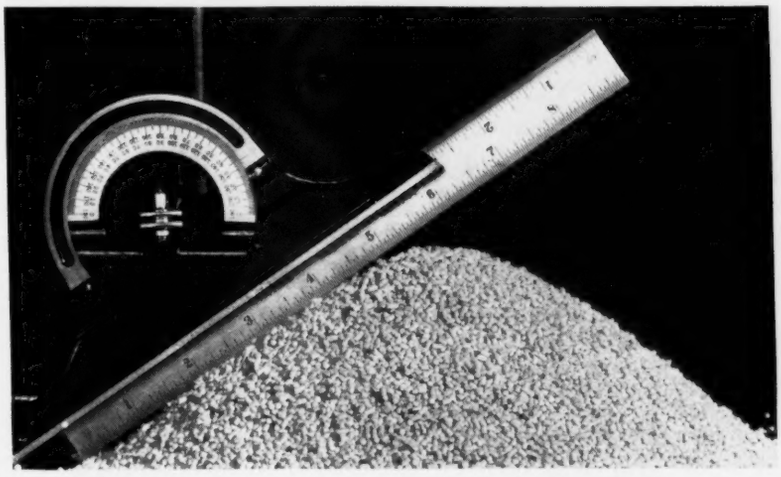
Lowell Thomas shows up at last! Members and guests of the Salesmen's Association of the American Chemical Industry after listening for two and one-half hours to one of America's two greatest adventurers were one in agreeing that his talk was well worth the long wait

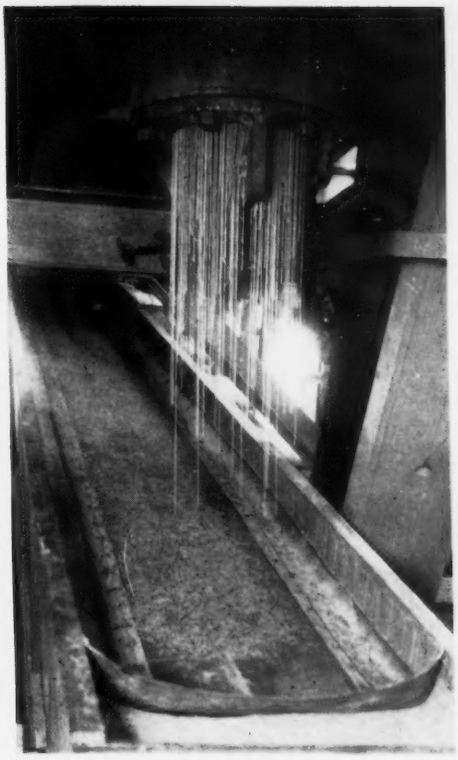
Two Boardwalk windows of the Du Pont Exhibit in Atlantic City are devoted to displays in the manufacture of which Grasselli chemicals enter. One features Exide storage batteries. Weed auto chains, in the plating and finishing of which Grasselli chemicals are used, form the attraction in the other window

NEWS REEL

of Chemical Activities

New Swann highly concentrated (64% plant food) fertilizer adds new angle to the complex fertilizer situation. Photograph, below, shows uniformity of the particles and the absence of dust. Photograph, right, shows an important stage of manufacture, the extrude discharge. Particles are further processed and screened to produce the finished product





One of the most interesting power plants in the world is in full operation at Plainfield, N. J., and it costs practically nothing to run it because the power is derived from ordinary sewer gas obtained from the city's sewers. Long considered a dangerous explosive this gas has been tamed by Dr. John R. Downs, and made to drive electric generators, compressors, refrigerators, steam boilers, gasoline engines in the ultra-modern Plainfield Sewage Disposal Plant. Sludge is conducted from the settling tanks into three large digesting tanks. As sludge settles heat is applied. The gas rises and is gathered into a sort of reservoir on the top of the tanks from whence it is piped to the various buildings for any desired use

Keystone-Underwood

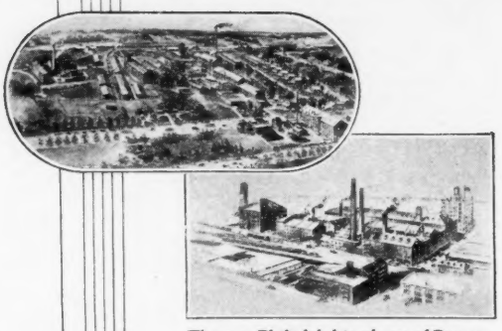
Awards for skill in the mining field came to two prominent members of the American Institute of Mining and Metallurgical Engineers. For his success in mining gold profitably from ore containing less than one dollar's worth a ton, Frederick W. Bradley, of San Francisco, received the William Lawrence Saunders Gold Medal, and the James Douglas Gold Medal went to Dr. C. H. Mathewson of Yale for distinguished service in non-ferrous metals. Left to right: Robert E. Talley, President of the Institute, Mathewson, Bradley, and Scott Turner, Director Bureau of Mines

Right, Dr. Downs at work in the plant's laboratory

Halbran

A Quotation from 1864

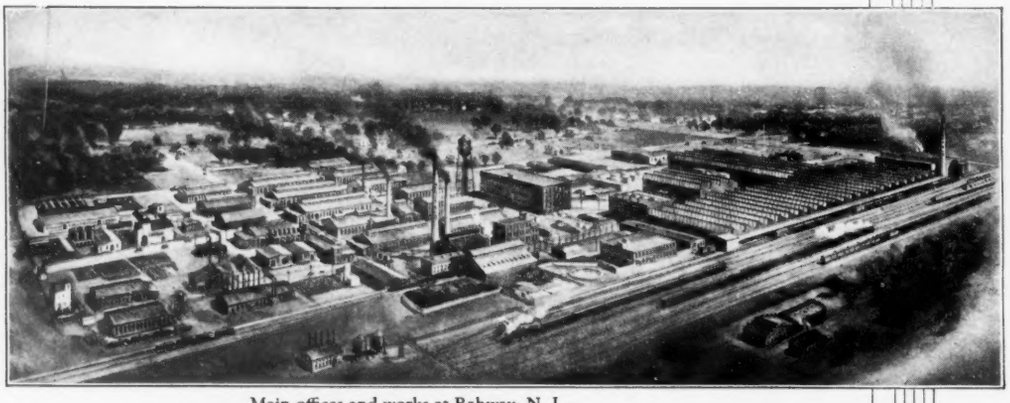
"The reputation of this house is unsurpassed for the purity and beauty of its chemicals, and for the fairness and liberality of its dealings. It is not saying too much to add that few examples can be found of a chemical establishment which, for a course of forty years, has uniformly sustained so high a reputation in these particulars."



The two Philadelphia plants of Powers-Weightman-Rosengarten Co. (for many years the center of fine chemical manufacture) operated since 1927 as branch factories of Merck & Co. Inc.

This statement in Bishop's "History of American Manufactures" (two volumes, 1864) indicates the high reputation enjoyed even at that time by one of the old companies which became part of the Merck organization. . . . Many of the foremost industrial and pharmaceutical chemicals of today were first manufactured in this country by one or another of the early pioneers who have since become part of the modern house of Merck . . . In 1823 American Quinine was first produced by one of these pioneers. . . In that year also Ether, Ammonia and Ethyl Acetate were made. . . Mercurials were first manufactured in 1834. . . Iodides and Silver Salts were produced in 1836. . . Since that time there has been a memorable succession of new manufactures with which the names Merck, Rosengarten, P. & W. are all identified. Today over three hundred industrial chemicals are manufactured and marketed in various grades and forms by the house of Merck . . . .

. . . Write for complete list . . .



Main offices and works at Rahway, N. J.

MERCK & CO. Inc.

MANUFACTURING CHEMISTS

Industrial Division: **Philadelphia**

RAHWAY, N. J.

New York **St. Louis**

MERCK & CO. Ltd. **Montreal**

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BROMIDES
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CITRATES
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GOLD CHLORIDE
IODIDES
MERCURIALS
MILK SUGAR
QUININE
SALICYLATES
SILVER NITRATE
SODIUM BENZOATE
ZINC STEARATE
and OTHERS

A Sane and Simple Tax

By Wm. M. Grosvenor

TAXATION is never a painless operation, and simply because it is a tax, plenty of objections can be raised to any system of Government revenue. It is moreover, the common habit of every man to cherish the belief that the particular taxes he pays are quite the most onerous and unjust. If his income is $5,000 he regards the exemptions for wife and children a pitiful sort of joke. If his income is $5,000,000 he feels that the surtaxes are a spiteful confiscation.

Since our present income taxes are paid by one citizen in thirty-two, there are a goodly host of objectors to any tax system which would frankly and openly distribute the burden of taxation more generally. The ninety-six who do not themselves pay a direct tax, are blissfully blind to the fact that the few who do pay take good care to collect it from those who do not, with a handsome bonus for the unjust treatment. Accordingly, the vast majority object to any sort of sales tax—it reminds them who actually and finally pays; they, the consumers. Yet a sales tax ultimately distributes the burden most equitably upon all those who spend and in exact proportion to their expenditure. It gives every citizen a self-respecting share in the government he supports and sharply reminds him that wasteful, incompetent or venal government is robbing him personally. Those who object to any form of sales tax are generally more ignorant or prejudiced than wise, for as a rule they know little about any kind of a sales tax except a direct tax on luxuries. Their protests are merely a sort of instinctive fear reaction to the unknown.

Therefore let us first impartially examine a suggestion made some years ago for a really democratic and simple form of sales tax—better named the "turnover tax"—to see if after all it is not fundamentally the best.

This is a tax on every sale of all sorts of goods, securities, real estate, and services, and is paid by the seller. There are no exceptions to such a tax. From

N. Y. Herald Tribune

the crude rubber, the sulfur, the aniline oil, the carbon black and all raw materials, through the tire manufacturer, the wholesaler and the retailer every sale pays that same tax. Every scientist, executive, lawyer, physician, stenographer, or laborer, whether corporation or government employee or private worker, every organization that sells its services pays its tax on what each has sold, be it labor of hand or brain, judgment or experience or knowledge.

Baldly stated that is the ideal tax. It is plainly the simplest in practice, the fairest in theory.

Here certain apparent objections will be raised, that:

First—such a system might pyramid the taxes, especially on the essentials, to intolerable heights.

Second, it might tax the poor man and the small unprofitable business unreasonably, and so violate the good old democratic principle of "ability to pay."

Third, it might give a great and unfair advantage to the big corporation with vertical organizations that control their own raw materials and distribution systems and so eliminate one or more sales in their operations.

Four, it might be too expensive to collect.

Those are all serious objections; but before we dismiss the turnover tax as inequitous and impractical, let us find out what the rate would have to be and how it might be administered.

For the first year it is admittedly a difficult thing to forecast the revenue from such a tax. Careful estimates have been made, however, and agree that a universal turnover tax of two-tenths of one per cent would yield a greater revenue (possibility twice as

much revenue) as the present federal corporation and income taxes.

That throws an entirely different light on the objections which were based on the hazy notion of a tax from one to ten per cent, for two-tenths of one per cent is a tax of two cents on ten dollars sales. It is only $2,000 on $1,000,000 worth of sales.

In this new light the objections to the turnover tax appear quite different. In the first place any business man can see plainly that whether he is selling caustic soda or diamonds, whether he runs a big factory or a news stand, a tax of 2c on $10 of sales could be absorbed in his general overhead along with rent and depreciation and bad debts and just as present taxes are absorbed. Secondly, he recognizes immediately that competition would force him to do that very thing.

Admitting that a turnover tax of two-tenths per cent would be absorbed by the seller without any violent upset of business or any jacking up of prices, what about the pyramiding of the tax through successive sales ?

No succession of possible turnovers has yet been discovered that involves more than nine distinct sales steps from raw material to consumer and even if every sale was at the full retail price the total tax would only be 1.8%. Remembering the fractional cost of raw materials and the successive write-ups from maker to jobber to retailer it is plain that the turnover taxes all added together would seldom total 1% or 1c on $1 of the retail price. From the wheat farmer to the bread basket commonly represents six distinct sales progressively increasing value in successive stages which have been figured out to be 6/10% on the ten cent loaf or 6/100 of one cent which is hardly to be branded as taking the bread from the children's mouths and throwing it to the politicians.

Elimination of Present Waste

Likewise the great advantage to the big integrated corporation becomes very thin when we deal with such figures. There would be no unsurmountable difficulty in collecting, if desired, a tax on intra-company sales which modern cost accounting scrupulously records on the company's books. In view of the notorious waste in our present distribution system, it might even be wise to use the turnover tax to promote the elimination of unnecessary steps in our present wasteful processes. This it would tend to do, and what a novelty it would be to have a tax law that actually fostered efficiency in private business and made governmental economy of personal value to every governmental employee.

The objection that a turnover tax would be impractical in workaday administration is least valid of all. Its provisions are so simple that obviously it would be a great convenience to tax payers. It is said we spend over $10,000,000 a year in fees to accountants and attorneys to prepare and justify our tax returns. What firm or individual does not know at any time its gross sales ? How simple it would be to make a return based on the simplest of all bookkeeping records ? Exit the army of tax experts, and that alone would be worth a pretty penny!

A universal turnover tax would be simply and certainly collected in this fashion. Every seller of any goods, real estate, securities or services, would be required to file in duplicate on 3 x 5 cards at some post office anywhere in the country, a simple statement of his gross sales for the preceding quarter any day between the first and fifteenth of the following month. If this amount were between $500 and $5,000, it would have attached thereto ordinary stamps from $1.00 to $10.00. Quarterly sales of $500 would be exempt from taxation but the return should be reported. Statements for sales in excess of $500 should be payable in cash at the post office or accompanied by certified check. Returns of the company by certified checks might be mailed directly to the district revenue office.

Mechanics of Collecting Tax

In any case, a duplicate report card bearing a 2c stamp would be receipted by the post office or district revenue office and returned. This 2c stamp tax would give the post office a revenue that would more than cover the cost of collecting the tax, and the quarterly payments would furnish the Government with a regular inflow of revenue throughout the year.

Every firm or individual in business would have to be able to produce the receipts, and checking the sales would be simplicity itself compared with the present system. For convenience, sales through brokers—stocks and bonds, real estate, imported goods, etc.—might well be collected at the source, in which case the broker would make one return for his clients on the gross amount of their sales and another for himself on his gross commissions. In like manner the tax on personal services (salaries and wages) might also be collected at the source, the employer paying $^2/_{10}$% on his total payroll and deducting the tax from wages and salaries. These returns might be handled at the same time, on the same blanks, through the same channels, as the turnover tax itself.

The 3 x 5 card statements fit perfectly into the simplest and most compact of filing systems and the cards themselves could be easily perforated for use in statistical tabulating machines. From the point of view of the taxpayer the 3 x 5 card is his permanent receipt-record of a finished tax transaction. From the point of view of the Government, the return would be a legal statement for which the statute might impose suitable penalties in case of fraud, and eliminate the necessity and expense of the notary public's seal and fee.

The objection that the turnover tax violates the principle of "ability to pay" is less serious than it appears, for a sales tax is a tax on expenditures. These

must be roughly proportionate to income, and in the last analysis, no matter how well concealed by indirect methods, present taxes do become a very real element in the costs of all goods which all the people buy. Many of us feel that unearned income should be subject to taxation, and there is no reason why there should not be exactly the same tax with the same exemption on all dividends and interest received. This would be a sincere and understandable tax on "unearned income." If there were exemption on the first $500 a quarter received from these sources, it would presuppose an invested capital of $50,000 at 4% thus exempting the savings of the real worker.

Think of the advantages of the turnover tax to the Government—a steady flow of revenue as little affected by good or bad times as it is possible for any levy to be. A tax whose income could be very accurately foretold, and the rate of which could be changed most easily. A tax that could be so well understood by the taxpayer and so quickly and accurately checked by federal inspectors that it would save vast sums now spent in records and clerks. Such a tax would abolish our present cumbersome and costly system of "refunds" and "back taxes." It would moreover, be a very difficult tax to evade.

What a joy a simple direct tax on sales would be to the taxpayer compared with the nightmare of uncertainty and bookkeeping that afflicts us under the present law!

Equipment Bulletins

Bakelite Corp., 247 Park Ave., N. Y. City. The latest number of the "Bakelite Review" contains in addition to numerous descriptions of new and novel applications of Bakelites an article on "High Speed Wheels . . . in Production Grinding" by E. D. Bishop.

The Dust Recovering & Conveying Co., Cleveland. A new leaflet describing in detail kiln dust recovery at the Ford Motor Co. cement plant by E. H. deConingh.

The Linde Air Products Co., 30 E. 42 St., N. Y. City. "Oxy-Acetylene Tips" for February has as its leading article, "Status of the Blowpipe in Power Plants."

Master Electric Co., Dayton. New 20 page booklet on Master Geared Head Motors, profusely illustrated and supplied with necessary engineering data.

Northern Blower Co., W. 65 st., Cleveland. Bulletin No. 500-1 describes the changes and improvements made recently in the "Norblo" line of dust filters.

Raymond Bros. Impact Pulverizer Co., 1302 N. Branch St., Chicago. A new booklet which summarizes the improvement and additions made in the Raymond Pulverizer line of equipment in 1931.

Semet-Solvay Engineering Corp., 40 Rector St., N. Y. City. Bulletin No. 45 is devoted to a detailed description with several pertinent photographs of the Semet-Solvay Koller Type of Gas Producer.

Semet Solvay Engineering Corp., 40 Rector St., N Y. City, has just released Bulletin No. 44 a very complete survey of over fifty pages Semet-Solvay piping and valves. Attention is directed to the tables of standards; the very complete indexing on pages two and forty-eight; the suggestions presented for efficient planning of new piping offered on pages eight and nine; and the diagrams of operating arrangements for gate valves.

Benzyl Cellulose---A New Plastic

The "Chemical Age" (London) in its February 20th issue summarizes briefly some of the outstanding characteristics of the new benzyl cellulose.

Benzyl cellulose is prepared by the action of caustic soda and benzyl chloride on cellulose. Benzyl alcohol, dibenzyl ether and sodium chloride are the by-products formed. As benzyl cellulose is soluble in these organic by-products the reaction mass is in a rubbery gelatinous form from which the by-products are removed during the purification. Various organic solvents may be used in the purification to extract the benzyl alcohol and dibenzyl ether, but the sodium chloride is removed during the water washes. When purified and dried, benzyl cellulose is of a cream colour, which becomes white when bleached. The viscosity of the product may be varied either during the process of benzylation or by subsequent treatments. In this way, a range of materials suitable for various technical applications may be prepared. Various degrees of benzylation may be attained, but the technical product, with the most useful range of solubility contains approximately two benzyl groups per $C_6H_{10}O_5$. Benzylation is a progressive reaction and therefore differs from acetylation, where the tri-ester is first prepared and is then partially hydrolyzed to produce the acetone-soluble acetate, which is employed for most industrial purposes.

Outstanding Features

The outstanding property of benzyl cellulose is its stability. It resists the action of alkali up to 20 per cent concentration, is unattacked by sulfuric acid of accumulator strength (sp. gr. 1.4) and thus has advantages over cellulose acetate. It is thermoplastic and can be heated up to 180° C. without fear of decomposition, and being relatively non-inflammable, like the acetate, can be worked at high temperatures without danger. A property which gives it advantages over other cellulose derivatives is its resistance to water. Its hygroscopicity is 0.5-1.0 per cent, compared with 8-9 per cent in the case of cellulose acetate. Films and articles made from benzyl cellulose are practically impermeable to water. The electrical properties of benzyl cellulose are also excellent and since it is unaffected by ozone there is promise of a wide outlet for it in certain directions in the electrical industry where rubber rapidly perishes.

Moulding Powders

The thermoplasticity and stability of benzyl cellulose make it an ideal base from which to prepare moulding powders. Such moulding powders show no signs of decomposition on prolonged storage. Moulders are familiar with the smell of acetic acid which develops in many cellulose acetate moulding materials on storage, indicating the gradual decomposition which is taking place due, possibly, to traces of sulfuric acid, etc., left in the cellulose acetate. Even the action of relatively strong acid or alkali leaves the benzyl cellulose composition unchanged. Marine weathering tests on ship-board show that mouldings from these moulding materials, after months of exposure in the heaviest of seas and extremes of climate remain unaffected. The thermoplastic properties of benzyl cellulose, which melts at about 180°C. but softens at lower temperatures, endow the moulding materials with exceptional flowing properties. Such moulding materials are therefore ideal for use in injection moulding. They are free from volatile materials, no solvent is used in their manufacture, and the products, therefore, do not warp. Moulding is carried out at temperatures of 120-160° C. For straight moulding a pressure of ½-ton per sq. in suffices, while for injection moulding the normal pressures and injection equipments are used. No curing or hardening process is necessary.

The Cellulose Ethers

By Dr. Charles E. Mullin
and
Dr. Howard L. Hunter

THE commercial success of the cellulose esters in the manufacture of synthetic yarns, lacquers, plastics, films, etc., has naturally attracted considerable attention to the more or less closely related compounds of cellulose, such as the cellulose ethers. The fact that these ethers have many of the most desirable properties of the esters, yet are not identical with them, indicates that they possess intrinsic properties of commercial interest and value.

It is well known that a great deal of work has been done upon the cellulose ethers by many able scientists and research groups, and their success from the technical or scientific standpoint is proven by the number of patents in this field. On the other hand, the price of these products has been so high that they have found very few industrial applications. One of the few industrial applications of the cellulose ethers is that of a methyl cellulose, known as "celloresin," which has been used[a] to a limited extent as a gum or thickener in textile printing, etc., but even this remains too expensive for general use. The fact that it is water-soluble, but coagulates in the presence of alkalies, renders it valuable in the printing of certain vat dyes, etc.

As compared with the cellulose esters, the ethers are very stable compounds. They are not hydrolyzed in solution and are not affected by even a 25 per cent solution of potassium hydroxide. They are not inflammable and are soluble in a wide variety of organic solvents, such as alcohol, ethyl acetate, ether, acetone, chloroform, carbon tetrachloride, benzene, etc. Many of them are soluble in water at low temperatures but are insoluble at higher temperatures. These properties indicate great industrial potentialities deserving more research and study.

Our knowledge of cellulose ethers is very limited, since these compounds have been known for only a few years, and although the number of patents which cover their manufacture is comparatively large, the research which is the basis of these patents has not been published. As the result, most of the available information on the subject must be secured from the patents, rather than from the scientific literature.

An ether may be defined as an aliphatic or aromatic alcohol in which the hydrogen of the hydroxyl group has been replaced by radicals, such as methyl, ethyl, or aryl groups, etc. The ether which is most familiar to chemists and others is diethyl ether, which has been used for many years as an anaesthetic and solvent. This ether may be considered as a derivative of ethyl alcohol in which the hydrogen of the hydroxyl group has been displaced by an ethyl radical, C_2H_5O-C_2H_5.

It is a generally accepted fact that the cellulose unit ($C_6H_{10}O_5$) contains three alcoholic hydroxyl groups and it is evident that under suitable conditions, the hydrogen atoms of any one or all of these hydrozyl groups may be replaced by alkyl or aryl groups to

Dr. Howard L. Hunter

Announcement of the Imperial Chemical Industries Commercial Introduction of Benzyl Cellulose focuses attention on the importance of the Cellulose Ethers to the Lacquer, Plastics and Synthetic Yarn Industries

Dr. Charles E. Mullin

give the corresponding ethers of cellulose. A wide variety of the alkyl and aryl groups may be substituted for hydrogen in this manner. If the hydrogen is replaced by a methyl radical, a cellulose methyl ether results; an ethyl radical gives the product known as ethyl cellulose. One, two, or three benzyl groups give the mono-, di-, or tri-benzyl celluloses.

Mixed ester-ethers are also possible, in which the hydrogen of one or two hydroxyl groups is substituted by an alkyl, aryl, or aralkyl group, and the remaining hydroxyl groups are esterified, as by acetic or other acids. These mixed ether-esters offer a further wide variety of interesting products.

As would be expected, the properties of the cellulose ethers vary quite widely, depending upon whether one, two, or all three of the hydroxyl hydrogens have been replaced, the different alkyl or aryl radicals used, the method of preparation, degree of degradation of the cellulose, etc. In many cases the cellulose is treated with sodium hydroxide solution, to form soda-cellulose, before it is treated with the etherifying reagent. In some instances, this soda-cellulose is aged before etherification. Some change in the cellulose occurs during this ageing of the soda-cellulose, but in certain other processes the alkali treatment and etherification proceed simultaneously. Obviously, the final products will not be the same.

Only those who have actually worked with the cellulose ethers and esters fully understand how much even slight changes in the methods and conditions of esterification and etherification alter the constitution and properties of the resulting products, which are, in practically every case, mixtures of several or many different compounds, rather than one definite chemical compound. Only under very definite and accurately controlled conditions is it possible to obtain a product with the desired properties, and this product is almost always a mixture of chemical compounds. It is usually very difficult to isolate the chemically pure cellulose mono-, di-, or tri-ester or -ether, and this is never attempted in commercial preparations.

The widely varied solubility and other properties of such products offer the possibility of many more or less different and valuable products for special purposes, such as synthetic yarns, lacquers, films, plastics, etc., but it renders their successful commercial production both difficult, tedious, and expensive. Without doubt this high cost of production is the one factor that today limits or inhibits the wide industrial usage of certain cellulose ether products.

There are two general methods which may be utilized in the preparation of ethers from aliphatic alcohols. The first of these consists of the action of an alkyl halide on an alcoholate, such as sodium alcoholate. The typical equation for this reaction is as follows:

$$C_2H_5ONa + C_2H_5X \longrightarrow NaX + C_2H_5OC_2H_5$$

in which X may represent chlorine, bromine, or iodine.

The second general method consists of the reaction of an ester, preferably an inorganic acid ester, with an alcohol or alcoholate. A typical equation for this reaction is:

$$2C_2H_5OH + (C_2H_5)_2SO_4 \longrightarrow 2C_2H_5OC_2H_5 + H_2SO_4$$

Analogous reactions to those just illustrated may be carried out with cellulose and the resulting reactions may be represented as follows, assuming that the empirical formula for the cellulose molecule or unit is $C_6H_{10}O_5$.

$$C_6H_9O_4.ONa + C_2H_5I \longrightarrow C_6H_9O_4.OC_2H_5 + NaI$$

$$2C_6H_9O_4.OH + (C_2H_5)_2SO_4 \longrightarrow 2C_6H_9O_4.OC_2H_5 + H_2SO_4$$

These equations show only the reaction of one hydroxyl hydrogen atom, but similar replacement can take place with both of the other two hydroxyl groups in the cellulose molecule.

Preparation of Alkylation Agents

Before considering the actual processes for preparing the cellulose ethers, it will perhaps be advisable to consider briefly the sources of the alkylating agents employed.

Both ethyl chloride and diethyl sulfate were formerly prepared from ethyl alcohol, but more recently both of these compounds have been prepared at a much lower cost from ethylene gas. The latter is a constituent of the gases resulting from the destructive distillation of soft coal and from the pyrogenic cracking of petroleum oils. Sulfuric acid reacts under pressure with ethylene according to the following equation:

$$H_2SO_4 + 2C_2H_4 \longrightarrow (C_2H_5)_2SO_4$$

The diethyl sulfate formed by this reaction is a colorless liquid boiling at 208° C. with partial decomposition. It is insoluble in water but is decomposed by it slowly at ordinary temperatures. Its poisonous properties make it unpleasant to work with in commercial quantities.

Ethyl chloride may be prepared in an analogous manner by the action of hydrogen chloride gas on ethylene in the presence of an aluminum chloride catalyst at a pressure of 35 atmospheres. The equation representing this reaction is as follows:

$$C_2H_4 + HCl \longrightarrow C_2H_5Cl$$

Methyl chloride may be prepared by heating trimethylamine hydrochloride to a temperature of 360° C. The latter compound is obtained from the gases formed during the dry distillation of the residue from the distillation of molasses. Both methyl and ethyl chloride are colorless gases at ordinary temperatures, but can be shipped in liquid form in steel containers.

aBritish Patents Nos. 304,787 and No. 344,528.
bBritish Patent No. 183,908.
cBritish Patent No. 313,538.
dBritish Patent No. 308,348.
eUnited States Patent No. 1,503,604.
fFrench Patent No. 642,220.
gBritish Patent No. 318,088.

Cellulose for the preparation of the ethers may be obtained from any convenient source, such as wood, cotton linters, or the regenerated cellulose from the manufacture of rayon.

Several preliminary treatments have been recommended for the cellulose in order to make it more reactive and more easily etherified. Plauson has patented[b] a process for the mechanical disintegration of the cellulose to a diameter of 0.8 micron, by means of a colloid mill. This colloidal cellulose, when dispersed in an aqueous medium, is claimed to be in a very good state for etherification. Klein[c] advises replacing the water in colloidal cellulosic material with an agent capable of swelling or dissolving in the reagents subsequently applied. Glycerine is especially recommended for pretreatment of cellulose for etherification. Such a preliminary treatment is claimed to aid materially in the subsequent alkylation or benzylation.

Pretreatment of the cellulosic material with hydrofluoric acid to remove any silicious matter, and with formic or acetic acid to remove waxes, oils, etc., has been patented[d] by the British Celanese Company, Ltd. A preliminary treatment with a dilute solution of a strong mineral acid, which is subsequently removed before causing deleterious breakdown of the fiber, has been patented by the Eastman Kodak Company[e].

Treatment with softening agents, such as propylnaphthalenesulfonic acid or its derivatives or salts, aids etherification, according to a patent[f] of the I. G. Farbenindustrie. According to Lilienfeld[g], cellulose which has been subjected to a preliminary treatment with an alkali and carbon disulfide, under such conditions that part of the product is insoluble, is particularly adapted to etherification.

Benzene or some other non-etherifiable liquid has been suggested[h] as an excellent medium for the preliminary treatment of the cellulose with caustic soda. It is claimed that the use of such an inert non-aqueous liquid aids the subsequent etherification.

Preparation of the Sodium Cellulosate

It is well known that sodium cellulosate, or soda-cellulose, is much more reactive than the normal or unaltered cellulose. Even in the case of the ordinary aliphatic alcohols, such as ethanol, the formation of the sodium compound, sodium ethylate, is essential for the formation of the ether upon treatment with the alkyl halide. Therefore, it is not entirely unexpected that an alkaline treatment of the cellulose is essential before or during the treatment with the alkyl halide or sulfate. Most of the carbohydrates are easily oxidized in the presence of alkalies and in some processes for the manufacture of the cellulose ethers, the soda-cellulose is aged, as in the manufacture of viscose silk, before the etherification. Although it is not universally accepted that oxidation of the cellulose during this ageing process is the only reaction which occurs, it is quite probable that oxidation plays some part in the changes taking place in the cellulose. It is well known that both oxidized and hydrolyzed cellulose are considerably more reactive chemically than normal cellulose.

Since the use of an alkyl halide or sulfate in the etherification process results in the formation of the corresponding inorganic acid, some provision must be made to neutralize this free acid before the cellulose is degraded or hydrolyzed. The sodium hydroxide formed by the decomposition of the soda-cellulose serves to neutralize this free acid as it is formed, but in some processes an additional amount of finely

Table I

SOLVENTS FOR THE CELLULOSIC ETHERS IN GENERAL

Solvent	*Inventor or Assignee*	*Reference*	*Date*
1, 4-Dioxan	Reid and Hofmann	J. I. E. C. 21,695	1929
BB′-Dichloroethyl ether	Celluloid Co.	U. S. Pat. 1,620,977	1927
Wood oils	Pfiffner and Ow-Eschingen	Brit. Pat. 231,161	1925
Nitromethane and a lower monohydric aliph. alc.	Lilienfeld	U. S. Pat. 1,599,569	1926
Alkylated sulfonamide derivatives	Dreyfus	Brit. Pat. 164,386	1919
Triacetin	"	" " "	"
Trichloro-tertiary butyl alcohol	"	" " 205,195	1922
Carbon disulfide	I. G. Farbenindustrie	" " 295,942	1927
Benzol and methyl acetate	Eastman Kodak Co.	U. S. Pat. 1,405,449	1922
Chloroform and methanol	" " "	" " " 1,405,487	"
Acetone oil	" " "	" " " 1,469,812	1923
Benzyl acetate	" " "	" " " 1,469,863	
Methanol, methyl acetate, and acetanilide	" " "	" " " 1,548,938	1925
Monochlorobenzene and a lower monohydroxy aliph. alc.	" " "	" " " 1,411,708	1922
Carbon tetrachloride	" " "	" " " 1,418,413	"
Furfural	" " "	" " " 1,450,716	1923
Perchloroethylene	" " "	" " " 1,450,714	"
Methyl salicylate	" " "	" " " 1,450,715	"
Methyl benzoate	" " "	" " " 1,469,813	"
Ethyl benzoate	" " "	" " " 1,469,862	"

Table II

SOLVENTS FOR THE ALKYL ETHERS OF CELLULOSE

Solvent	*Inventor or Assignee*	*Reference*	*Date*
Chloroform and alcohol	Eastman Kodak Co.	U. S. Pat. 1,394,505	1921
Ethyl acetate, ethyl alcohol, and water	" " "	" " " 1,425,173	"
Methanol and toluene	" " "	" " " 1,441,143	1923
Methyl acetate and monochloronaphthalene	" " "	" " " 1,467,091	"
Lower monohydroxy aliph. alc. and tetrachloroethane	" " "	" " " 1,432,364	1922
" " " " " ethylene chlorobromide	" " "	" " " 1,432,373	"
" " " " " phenol	" " "	" " " 1,434,426	"
" " " " " pentachloroethane	" " "	" " " 1,434,427	"
" " " " " a phenyl ether	" " "	" " " 1,479,955	"
Ester of a lower monocarboxylic fatty acid and a lower monohydroxy aliphatic alcohol	" " "	" " " 1,432,365	"
Acetic ester of a lower monohydroxy aliphatic alcohol and chloroform	" " "	" " " 1,464,169	"
Acetic ester of a lower monohydroxy aliphatic alcohol and ethylene chloride	" " "	" " " 1,464,170	"

powdered sodium hydroxide is mixed with the cellulose. The use of an inert diluent, such as benzene, in which the sodium hydroxide is suspended is a later improvement, in that it renders the control of the water present during the reaction much easier; a factor which is very important in determining the properties of the resulting ether. Denham and Woodhouse[1], in their original work, allowed the cellulosic material to stand in a 15 per cent solution of sodium hydroxide for two or three days. In some later work[3] they impregnated the cotton wool with a 17 per cent solution of sodium hydroxide. In the original work of Bayer and Company[i] the cellulose was allowed to swell in concentrated cellulose for one to two days and the excess of alkali then removed mechanically.

The First Cellulose Ethers

According to the literature, Bayer and Company were the first to prepare the ethers of cellulose. On January 26, 1912, they were granted a patent[j] for the preparation of cellulose ether by the action of an alkyl halide on alkali cellulose. The method consists of forming sodium cellulosate, by allowing the cellulose to stand in concentrated sodium hydroxide solution for one or two days. The excess of caustic is removed by pressure or centrifuging and the soda-cellulose dried in a vacuum, or by distillation with an anhydrous liquid. The soda-cellulose is heated under pressure at 130° C. for eight hours with three parts of an alkyl halide, calculated on the original weight of the cellulose, with occasional stirring.

This cellulose ether is in a colloidal state and, after distilling off the excess of halide, the residue is extracted with water to remove the inorganic salt. The cellulose ether is then dried and further purified by redissolving in a suitable solvent, filtering, and reprecipitating, by the addition of water. This final dried product is a white, amorphous powder which is stated to consist of the mono-, di-, or tri-ether, or a mixture of these, depending on the conditions of the reaction and the quantities of reagents employed.

In the same year, before any scientific research on the cellulose ethers had been published, Leon Lilienfeld was granted a patent[k] covering the preparation of a cellulose ether. This patent specifies the use, as a starting material for the etherification, of cellulose modified in such a manner as to be soluble in alkalies. This cellulose is treated with an alkyl ester of an inorganic acid, in the presence of a base. An example given in the patent uses cellulose prepared by regeneration from a solution of ordinary or modified cellulose, such as that from viscose, zinc chloride, or cuprammonium solution. Solid sodium hydroxide and a 30 per cent solution of sodium hydroxide are added to a solution of this modified cellulose and, after moderate heating, diethyl sulfate is gradually introduced. After further heating on a water bath and then cooling, dry, powdered caustic is added while stirring. This mixture is heated and again treated with small portions of diethyl sulfate. The cellulose ether formed is recovered from solution by precipitation and filtration. This patent states that the degree of etherification of the cellulose is determined by the conditions and the proportions of the reagent used.

Early Research on the Ethers

The first work of a scientific nature published on the subject of the cellulose ethers is that of Denham and Woodhouse[1] in 1913, a year after notice of such compounds had occurred in the patent literature. Willstatter and Zechmeister[2] had previously shown, by the quantitative conversion of cellulose into dextrose, that the cellulose molecule must be composed entirely of dextrose (anhydro-glucose, $C_6H_{10}O_5$) residues. Denham and Woodhouse tried to determine the nature of the linkages between these residues or units by methylating the cellulose and studying the methylated dextroses. They employed methyl sulfate, rather than an alkyl halide, for the etherification. As a source of cellulose they used cotton wool, and very

hBritish Patents Nos. 311,697 and 176,420.
iGerman Patent No. 322,586.
jGerman Patent No. 322,586.

finely shredded calico which had been wet-beaten to a fine pulp and then dried. The cellulose was first converted into soda-cellulose by treatment for three days with a 15 per cent solution of sodium hydroxide. This product was added in small portions to a large excess of dimethyl sulfate, until the reaction mixture was no longer alkaline. The reaction is exothermic and upon completion, the ether was purified by washing successively with water, very dilute alkali, and an acid, after which it was dried in a vacuum at 120° C. An analysis of the product indicated the composition, $C_{12}H_{19}O_9.OCH_3$. After subjecting this substance to a second methylation in a similar manner, the resulting product corresponded to the formula, $C_6H_9O_4.OCH_3$, and a third methylation gave the product, $C_{24}H_{35}O_{25}(OCH_3)_5$. Since the publication of this pioneer work by Denham and Woodhouse, many cellulose ethers have been prepared and studied, and many more have been described in the patent literature. These will now be discussed in detail, starting with the alkyl ethers in a later paper.

Production and Uses of Magnesium Salts

World importance of magnesium sulfate and of magnesium chloride is dependent largely upon their comparative cheapness and location of raw materials in relation to points of consumption. The U. S. and Germany produce the bulk of all consumed. Both compounds as manufactured in the U. S. require more processing than the German output, which is all from recovery of former waste potash liquors, according to a report issued by the Chemical Division of the Bureau of Foreign and Domestic Commerce.

Prior to 1914, only a small fraction of these waste liquors, according to market demand, was processed for commercial magnesium chloride for an output of approximately 22,000 tons of solid and 79,000 tons of liquid and about 92,000 tons of magnesium sulfate, while approximately 800,000 tons of magnesium chloride and about 100,000 tons of magnesium sulfate were discarded annually.

Textiles, paper, and leather may have received certain of their characteristics from being processed with this chemical. The relation of magnesium chloride to human use is less direct but no less important, and probably more far reaching. As a raw material for magnesium metal, which is fast assuming importance as an alloy in articles of household and industrial utility where greater lightness in weight is desired, magnesium chloride is of great interest. Other important uses include sizing textiles, dust laying, chilling tools, dyeing, fireproofing and extinguishing, and in flooring compositions, floor-sweeping compounds, cement, stucco, and marble.

Distribution, Notable Uses, and Linkage with Other Products

Magnesite or natural magnesium carbonate can be interchanged as raw material for magnesium chemicals with bitterns from wells or sea water or potash by-products brine. Both magnesite and sea-water bitterns, for example, have been used for the same magnesia products by an American company. The importance of this interchangeability becomes evident in times when lessened activities in large consuming industries, such as iron and steel and building, curtail their use of dead-burned magnesite or technical carbonate and permit accumulation of supplies which may be utilized for chemical salts production.

Essentially, the cheap natural resources of Germany, on the one hand, and the U. S. on the other, are in competition in the principal world markets for the chloride and sulfate. To a greater extent, the U. S. market, formerly supplied by Germany, is being supplied by the American output. Production of the chloride advanced from about 13,000 short tons in 1919 to 30,000 in 1925. Imports declined from a maximum of 11,500 tons in 1923 to 1,000 in 1930. United States output of the sulfate increased from 14,600 short tons in 1914 to nearly 37,000 in 1929. Imports, which stood at 3,500 tons in 1915, have ranged from 5,000 to 6,000 tons in recent years.

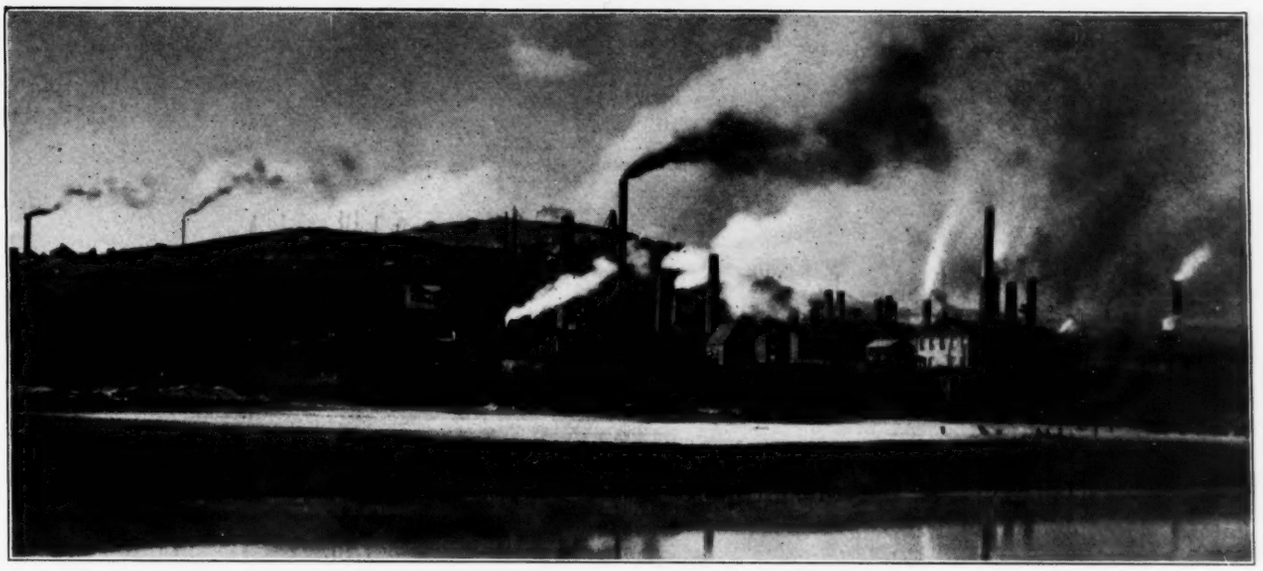
The 1930 output of magnesium sulfate, chloride, and carbonate from natural salt and bittern waters totaled 36,627 short tons, valued at $1,071,112, according to Mineral Resources of the United States. Since 1927 magnesium chloride, recovered as a joint product of salt wells in Michigan, has been used for the entire United States output of metallic magnesium.

German Production of Magnesium Salts

In Germany the production of potash, bromine, salt cake, and Glauber salt are factors affecting the cost and quantities of magnesium salts produced. With the exception of bromine, greater or smaller quantities of either of these salts may be made as well as of magnesium chloride and sulphate, according to the market conditions. In 1930 German output of these chemicals was at the rate of around 50,000 metric tons of solid magnesium chloride (with additional quantities in solution) and about 125,000 tons of magnesium sulfate. German exports of the sulfate in recent years ranged from 90 to 100,000 metric tons, and of chloride from 37,000 to 43,000 tons.

One of the larger outlets for technical magnesium sulfate in Germany is in rayon manufacture. According to the late Consul H. C. Claiborne, Frankfort on the Main, 4 to 4½ tons are used per ton of finished rayon.

Our West Coast deposits of magnesite act as double assurance of an uninterrupted supply of magnesium salts and the metal. The use of magnesite rather than brine from wells depends upon several economic factors



Chimneys belching forth smoke across the horizon are now strangely silent in most of the copper refining centers of the world

Copper Sulfate Price is Lower

Curtailment of metal production has signally failed to affect improvement as yet in the price of either the metal or the sulfate

MOST spectacular of the chemical declines in this twenty-seven months era of dropping prices has been that of copper sulfate. The announcement (February 15) of a further reduction of thirty-five cents per hundred pounds, in carload lots, packed in barrels, brings the price down to $2.75, the lowest figure in the records for this important commodity.

The severity of this reduction is made more vivid when a few lines are quoted from a statistical survey of copper sulfate which appeared as late as the May, 1930 issue of CHEMICAL MARKETS: "Surprise has been expressed in some quarters at the extent of the recent reduction in the price of copper from eighteen to fourteen cents a pound. The old level had been maintained for about a year and, even in the face of a general business depression, was thought to be fairly well stabilized . . . Following closely upon the decline in the metal price, quotations on copper sulfate were lowered from $5.50 per hundred pounds to $5.00 . . . it must be remembered that, while the metal price has remained unchanged for about a year, the sulfate price was reduced fifty cents per hundred pounds during last October."

As this is written (February 17) copper is selling at 6¼ cents for electrolytic in the domestic market a decline of about 66 per cent from the high of 18 cents and copper sulfate at $2.75 a decline of 54 per cent from the high of $6.00. No usually stable heavy chemical of equal importance with copper sulfate has felt the deflationary tendency to anything like the same degree.

It must be borne in mind in any discussion of the copper sulfate price that it is always carefully atuned to changes in the metal market. The demand for copper sulfate as reported by leading producers for the years 1930 and 1931 compared very favorably with the peak years of 1928 and 1929. Any decline in price, therefore, might be reasonably attributed more to the result of the loss in the selling price of the metal rather than any serious curtailment in the use of its salt. Any loss suffered in quantities consumed in the eastern and middle-western sections has been compensated for by larger business on the Pacific Coast, which formerly was to a large extent in the hands of importers, and in South America. In other words the international competitive position of copper sulfate has become more acute. Is it possible that the current price reduction, and possibly the one previous, were made more with an eye to their effect on the international situation than to either a decline in the metal, or a decline in tonnages, or a combination of both? Were domestic producers informing foreign interests of their intention to increase sales in this country and in South America? Is copper sulfate now in the same class with citric and tartaric acids? Prices of these commodities have gone lower than the average chemical decline as a result of particularly keen competition between domestic and imported materials. Are the fairly cordial relations between

domestic copper sulfate producers and the British Copper Sulfate Export Association strained or about to be broken?

If these conditions do exist, it is possible that the usual relationship between the prices of copper and copper sulfate has been disturbed. Assuming that the usual relationship was in existence in May, 1930 when copper was selling at 14 cents and copper sulfate at $5.00 per hundred pounds then the proportion,

Crystalizing room of the Montecatini plant in Italy. Increases in productive capacity, abroad has increased appreciably the international competetive position of copper sulfate

14 cents is to $5.00 as 6¼ cents is to X dollars, should give the correct price for copper sulfate now. The answer is approximately $2.23, which is about 50 cents below the current price level of $2.75. If the stress of international competition were effecting the price to a greater degree than the actual decline in the metal market, the price of copper sulfate would be lower, rather than higher, than the $2.23 figure. The cost of manufacture-labor, acid, equipment, overhead, selling expense, is practically the same when copper sulfate is selling at $6.00 and when it is quoted at $2.75. As the price declines the margin out of which the sulfate manufacturer must cover these charges and earn his profit becomes progressively smaller. Some variation in the relationship between metal and sulfate price must be expected. This is the explanation for the $2.75 price. It would appear that domestic producers have not destroyed the usual relationship between the metal and the salt, but are compensating differentials in the decline in the various elements of their costs.

However the international situation in copper sulfate has also altered considerably. Italy formerly a large consumer in the famous vineyards has ceased to be a large importer of British sulfate. The Montecatini is now largely supplying this demand. France has increased production and in England the Mond Nickel Company was reported last year as adding to its Clydach plant. If, as is reported, the capacity of this plant has been increased to 50,000 tons a year then some rearrangement of export business of the large producing countries can be anticipated. In only one way would it be possible to offset this increase in productive capacity. That would be through an appreciable increase in consumption. The use of copper sulfate in fungicide control has shown consistant expansion and larger quantities are being used in water treatment, but its use in differential flotation has been seriously affected by the extremely adverse conditions in the metal industries. No new uses involving large tonnages have appeared.

New Processes and Uses

The "Fertilizer, Feeding Stuffs and Farm Supplies Journal" (London) reports a new method being introduced in France for the preparation of a phosphate fertilizer, in which the transformation of raw calcium phosphate into soluble phosphate is complete. In the process lead chloride is used as an intermediary reagent in a hydrochloric acid solution which, with calcium phosphate, gives lead chlorophosphate and calcium chloride. The lead chlorophosphate treated with nitric acid gives lead nitrate, and the phosphoric acid remains in solution in the nitric acid medium. The lead nitrate is removed by treating with potassium chloride and a mixture of potassium nitrate, and lead chloride is thus obtained. The latter is used again in the cycle of operations, and at the end a mixture containing nitric acid and phosphoric acid remains. This mixture, when saturated with ammonia, gives a soluble fertilizer, in which the whole of the phosphoric acid is in a soluble state. It is reported that the method has already been put into operation on a semi-industrial basis.

Four hundred and fifty thousand bushels of wheat owned by the Grain Stabilization Corp. was fumigated at Baltimore, Md., recently with a mixture of ethylene oxide and solid carbon dioxide in the proportion of 1 to 10. The use of these chemicals for the fumigation of grain was developed by R. C. Roark, principal chemist in charge of the insecticide division, and H. D. Young, an associate chemist, of the Bureau of Chemistry and Soils, and R. T. Cotton, a senior entomologist of the Bureau of Entomology. Experiments made with this fumigant by the chemical engineering division of the Bureau of Chemistry and Soils have indicated that with proper supervision of the fumigation operations the fire and explosion hazards are low.

New Construction

Barnsdall Oil Corp. of Tulsa, Okla., leased eight acres on Maumee Bay from Pure Oil and will erect a $2,000,000 alcohol plant on the site. Plant will make use of new process of extracting alcohol from crude oil by capturing the fumes of the crude in the adjacent refinery of Pure Oil.

Du Pont has announced that it will construct new plant at its paint and varnish factory in Philadelphia which will be devoted solely to manufacture of Dulux, its synthetic paint. New plant will be entirely modern in equipment and construction. The plans call for a building approximately 155 x 68 ft., the total cost of which will be $350,000.

With 1931 production at 50,000 tons, United States Potash, at Carlsbad, N. M., will build a refinery of 2,000 tons daily capacity and will sink a shaft to 1,100 feet to expedite ore delivery. C. A. Pearce, manager, states that the project will also include construction of a power plant.

The Economics Behind Mixed Fertilizer Prices*

By J. S. Owens†

SUPPLIES of fertilizer materials have developed much more rapidly than the market could be expanded. The increase in production can be explained only by the decreased costs which give encouragement even on falling markets. There may be an exception in certain European governments subsidizing air nitrogen fixation in one way or another to insure a supply of munitions. The government plants may operate at a loss rather than remain idle.

The German and French potash producers have been maintaining potash prices for six years through control of production, regardless of market conditions.

Since the beginnings of the commercial fertilizer industry, many materials have been important in international commerce. Chile has been sending nitrate of soda to Europe and North America for over a hundred years; Peru exported guano to many countries; Germany almost supplied the world with potash salts for 75 years; the United States was Europe's chief source of phosphorus until recently. At present Europe has more air nitrogen than she can consume—sulfate of ammonia, urea, ammonium nitrate sulfate, and other products are being exported to this country. A few years ago we shipped sulfate of ammonia to Japan, but now Japan is sending sulfate of ammonia to the Pacific Coast. Europe still obtains a large quantity of phosphates from us and we buy bone and tankage from South America. Since few countries could supply all of their own fertilizer requirements, the extensive fertilizer trade between them is doubtless mutually beneficial. The market is distinctly an international one with few artificial barriers. Price levels of materials are influenced more by world conditions than by local markets, and there is little probability of much change in the situation.

The low cost of ocean transportation has had much to do with international trade. Chilean nitrate of soda is brought 5,000 miles to Baltimore at a cost of $4.40 per ton, while railroad tariffs from Baltimore to Connecticut are $5.20. Potash is brought from Germany for about $2.00, but it costs $3.70 to ship it in carloads from Boston to the Connecticut Valley.

Railroad freight accounts for a considerable portion of our fertilizer cost. A reduction has been made this year of 90 cents per ton on shipments from Baltimore. However, water transportation to Connecticut shore and river points can be secured for about one-third of the railroad cost. Distribution from receiving centers could be made by truck at a

*Abstract of radio address over Station WCAC
†Connecticut Extension Agronomist

low cost for much of the State. Factories within the State and others nearby are delivering more goods by truck each season.

Transportation costs have been a big factor in bringing about increased concentration of fertilizers for the freight costs on a ton of 8-16-8 are only one-half as much as on two tons of 4-8-4, and the manufacturing may cost no more.

Fertilizer Prices at Low Levels

Although freight rates are higher than they were 20 years ago, many fertilizer materials are not. Sulfate of ammonia, for instance, is now only about 60 per cent. of the 1910-14 price on the wholesale market. Nitrate of soda is 90 per cent.; cyanamid about 45 per cent. Tankage and fish scrap are the only important carriers of organic nitrogen which are higher. Superphosphate is about 90 per cent. of the pre-war price, and potash salts 100 per cent. Farmers can secure the benefit of such low wholesale prices only when they decrease or eliminate costs incident to transportation, manufacturing and marketing.

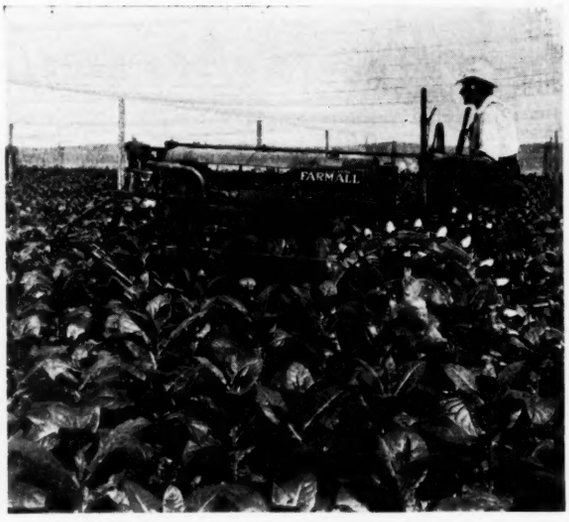
Although there have been important improvements in many manufacturing processes and in distribution, the cost of fertilizers at retail is frequently too far above that of the ingredients. A schedule widely adopted by manufacturers places retail prices at 85 per cent., plus the freight, above the cost of the materials. Some processes, such as treating rock phosphate with sulfuric acid, require special equipment and can be done only in expensive factories. Other processes involve only mechanical mixing such as can be done at home. Additional costs include storage, bags, shrinkage, and overhead. Little business is done in many plants except for about four months a year—consequently heavy overhead is necessary. Further, few plants operate at more than half capacity.

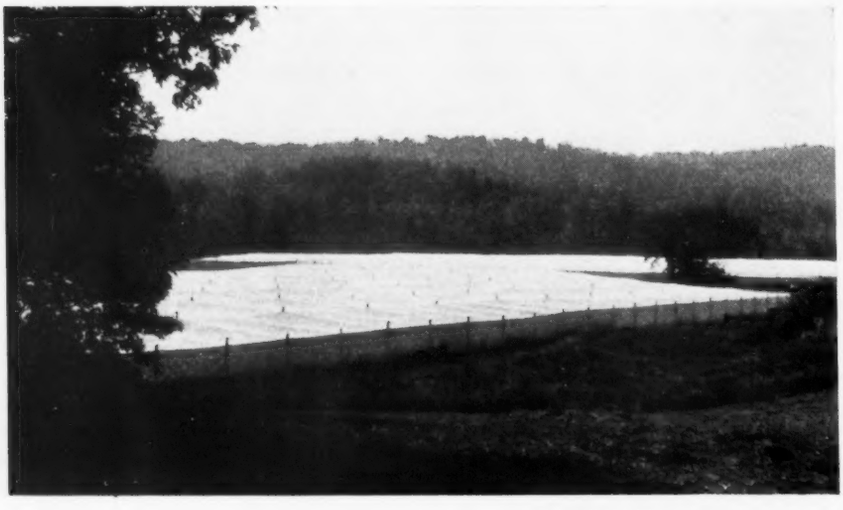
The development in manufacture is towards chemical processes which demand large investments and production on a large scale. The commercial fixation of air nitrogen, for instance, has been confined to a few plants. As chemical compounds with more than one plant nutrient element become more important, manufacturing will be still further specialized. Such developments will eliminate mechanical mixing and probably distribute production throughout the year.

Even today many farmers do not buy fertilizers; they wait until someone *sells* fertilizer to them. This is unfortunate, but hardly surprising, as the relation between an investment in fertilizer and the returns from it is not, as a rule, very clear. If it were generally easy to determine how much change an application makes, guesswork would be removed and far-reaching changes would occur in both fertilizer manufacture and use. Yet, farmers must be *sold* fertilizer and they pay a high price for this service.

The cost of the sales effort is only a part of the penalty. Goods must be made or at least labeled and advertised to attract attention. Very often they must be slightly different for each field or not just the same as neighbors buy. Buying costs might be reduced by purchasing with neighbors and co-operating in reducing the number of grades and selecting the manufacturer who has the greatest advantage in supplying the community.

There are some Connecticut farmers who *buy* fertilizers. They have a plan for improving each field and preparing for each crop. They know how





"The use of fertilizers can be justified only when they effect an improvement which is worth more than the cost. Their economic use depends, therefore, upon two things, (1) the extent to which a given fertilizer will improve a given crop, and (2) the relation between the value of the crop improvement and the cost of the fertilizer." In the author's state the tobacco growers have brought to their problems a high degree of intelligence and understanding. Left, a tobacco field under cover, producing the famous Connecticut shade-grown grades.

much fertilizer they can use long before planting season. The problem of selecting grades, or better still, the number of pounds of nitrogen, phosphoric acid and potash, are estimated for each application so the grade nearest the requirement can be chosen in case a mixed fertilizer is selected. If materials are available, the estimation of requirements gives an opportunity for comparison of cost.

Too Much Sales Pressure?

Far too often selling fertilizers has meant the farmer's making a poor choice. Salesmen are frequently better schooled in sales methods than in knowing how to fertilize crops to the greatest advantage of the farmer. The sales effort may mean poor selection, buying too much, and expensive credit. Sales pressure has caused the fertilizer industry to become bankers for farmers and they have had to charge heavily for it. Many collections are expensive; some bills are never paid; and credit charges must be high enough to cover all of these. Credit costs have been adjusted again this season to the advantage of the cash buyer. Until June 30, a discount of 12 per cent. will be given for cash at the time of purchase instead of 1 per cent. off each month, beginning with the first of the year. Sales effort has sometimes defeated its own purpose, for the extravagant claims and misleading information have made many farmers lose confidence in fertilizers.

Both manufacturers and farmers convert raw materials into more usable products. However, manufacturers invariably buy their raw materials at wholesale, while farmers still buy fertilizers at retail. Manufacturers estimate closely what materials can be used to advantage and what they can pay for them, but farmers frequently do not know what fertilizer will make the greatest effect upon the crop, how much they can afford to pay for it, or what quantity will give the greatest return for the investment. There is no single panacea for this problem, but enough acquaintance with fertilizers to permit careful selection will help. When this point is reached, fertilizers will be *bought*, and not *sold*. They will come directly from the manufacturer or distributor and will be handled just as bulky, low value materials are in the industries. The mystery about the nature of fertilizers is passing—should not the antiquated methods of merchandising go with it?

Probably fertilizer salesmanship should be credited with the mistake of far too many and unnecessarily low analyses grades being placed upon the market. The industry and agronomists have been co-operating for several years in trying to improve this situation, yet there are still some sixty grades sold in Connecticut each year. The confusion and extra cost caused by this situation need no explanation. Agronomists and most manufacturers are agreed that only a few well selected grades are enough. Exact information about the kinds and amounts of fertilizer needed are not, and probably never will be known, and yet a 3-8-4 and a 4-8-4 were sold by the same firm in this State last year.

When low analysis organic materials were plentiful, little was said about extra weight meaning additional cost. When sulfate of ammonia became cheaper than garbage tankage, and muriate of potash cost less per unit than kainit, a movement was launched to emphasize economy through "higher analyses." This is splendid when it is true, but sometimes low analysis materials are actually cheaper per pound of plant nutrient at the farm. Castor pomace, with only 5 per cent. nitrogen, is now a low cost source of organic nitrogen. There are certain by-product materials which will be wasted if not used as fertilizers. Their use is not objectionable because they are low in analysis, but only when low analysis means higher cost plant nutrients. The extremely highly concentrated fertilizers have not always been the lowest in cost, that is increasing concentration does not necessarily mean decreased cost, although it generally does and probably will do so to a greater extent as manufacturing methods are improved.

CREDIT CORRECTION

Editor, Chemical Markets:

On Page 62 of your January issue you give me credit for a method of producing a temperature of 3600° C. The method of producing the temperature is substantially as described by you and has been produced several times in the laboratory of the Ajax Electrothermic Corporation.

To Mr. Frank T. Chesnut of the Ajax Electrothermic staff belongs the credit for working out the technique of this method of producing temperature.

AJAX ELECTROTHERMIC CORPORATION,
Trenton, N. J., Feb. 19, '32 E. F. Northrup

Company Booklets

Harshaw Chemical, Cleveland, a new price list indicating the completeness of Harshaw service and stocks.

Ciba Co., has just issued new booklet. Photographs of various departments, a list of foreign branches and a brief history of the company are included.

The Davidson Commission Co., 175 W. Jackson Blvd., Chicago, a valuable booklet giving the 1921-1931 high and low records of important fats, oils and by-products.

Heyden Chemical, 50 Union Square, N. Y. City, wholesale price list for February 1932.

Mallinckrodt Chemical, St. Louis, February price list of chemicals for medicinal use.

Rossville Commercial Alcohol, Lawrenceburg, Ind. The February number of "Rossville Alcohol Talks" devoted to "Perfume and Health."

Thompson-Hayward Chemical, Kansas City. The latest issue of "The Test-tube" describes the unique history and ownership plan of the Thompson-Hayward company.

Tamms Silica Co., 228 N. LaSalle St., Chicago, issued a new catalog giving a great deal of valuable information on the various uses of different grades of silica.

Shall We Turn to "Merchandising" Chemicals

By S. L. Willis*

THE chemical process industries are now passing through a period of transition from the status of new, to that of old industries. This change is bringing about changes in competition which must be taken into consideration, if the various companies are to continue to operate on an adequate profit basis.

Some months ago the writer was called in by a manufacturer of certain chemical products, in order to find out what might be done to increase sales, and incidentally, profits. The survey showed that the company had been operating under patent protection covering many of its products, and during the time the patents were in force, price levels, and therefore profits, had been adequate. The entire production was sold to manufacturers who used the products as raw materials, and neither the name of the company nor its products had ever been brought to the attention of the ultimate consumer.

Trouble started shortly before the patents expired, thanks to new products developed by brother manufacturers. These new products took over some markets on a price basis, and others because the new product was more suitable. As soon as patent protection was lost, several manufacturers began making the products, and the price level dropped to a point where profit was non-existant.

This situation is by no means rare in the chemical industries even now, and as existing patents expire, it will become more prevalent.

The root of the trouble lies in the fact that, with one or two notable exceptions, the chemical process industries sell exclusively to other manufacturers or to package merchandisers, on a price basis. The products have no individuality, and ability on the part of competitors to lower the price results immediately in decreased sales.

Before mentioning possible solutions of the problem, it is interesting to examine the history and policies of outstanding leaders both inside and outside of the chemical group, and to see how they have met the situation.

The Bakelite Company and the DuPont Company are both chemical process manufacturers, but serve markets which are almost entirely distinct. The products of the Bakelite Company are solid to manufacturers for subsequent conversion into consumer products. In no case do they reach the consumer direct. In spite of this, thanks to well thought out and persistant consumer advertising, the name Bakelite is well-known to the consumer, and products using Bakelite have an advantage over others on that account. This prestige is easily convertable into better than competition prices, even though the patents have expired. The Bakelite Company also spares no effort to find and develop new uses for its products, and as a result has opened up numerous entirely new markets. These markets returned a good profit for a time at least, and the fact that Bakelite developed them, added materially to the company's prestige.

In fairness to other manufacturers of plastic compounds it is well to point out that Bakelite was first in the field, and for this reason had little difficulty in capturing consumer attention. The newer compositions started out under a consumer handicap, particularly where there was no noticeable difference in appearance. Even in these cases, however, the matter of trade-mark prestige is worthy of consideration.

The Dupont Company, thanks to its previous experience in the explosives field, has always been in close contact with the consumer. The significant fact about the Dupont merchandising policy is that this contact has never been allowed to weaken. Dupont seldon sells a product until it has advanced in manufacture to a point where it commands individual

*Consulting Engineer

recognition by the industries or public using it. In some cases such as Cellophane, the Bakelite procedure is followed, while in others, Duco for instance, this practice is coupled with sales direct to the consumer for his individual use.

The glass industry is a hot bed of cut-throat competition which at times, in the case of some commodities, reaches a point where the manufacturing cost is higher than the retail price. In spite of this general condition, the Corning Glass works has been able to maintain its prices at a profitable level, and to expand production from year to year. Formerly a manufacturer of lantern globes and similar products exclusively, the company now commands a pre-eminent position in a wide variety of markets. Here again we find trade-mark and quality prestige playing an important part in the final result. The names Pyrex, Nonex, Nultra, Corex, and Corhart are well entrenched either with the general public or with the industries using the products bearing them. Other factors include a highly efficient research department, a machine development department which has lowered costs by contributing many labor saving machines, and a market development group which has filched markets totalling several millions of dollars a year from sheet metal, porcelain, plastic, and common glass.

Pulp production is another industry which suffers from excessive competition. Here the domestic situation is complicated by large low cost importations, and every domestic producer of pulp and news print is either losing money or is barely holding its own. The Brown Company was the first to see the handwriting on the wall and many years ago began to lay the foundation for its present outstanding position in the field. Following the same lines as the other companies mentioned, the Brown Company never sells its main products until they have acquired individuality in public or industrial eyes. Where a basic commodity such as pulp is sold to other manufacturers it is specially refined trade-marked pulp which commands a premium. In no case does it compete directly with the ordinary product. The Brown Company's research laboratory is second to none in the paper industry, and this, together with its merchandising and market development policies, is the reason for the company's success.

Points of Similarity

This list of companies could be extended further but enough has been said to point the way.

Careful examination of the examples cited discloses the following points of similarity.

1. A main product is never sold until it has acquired individuality in consumer markets, and every effort is made to maintain that individuality by quality maintenance, trade-mark, and advertising means.

2. A market promotion organization is continually on the look-out for new uses for the company's products, and for market opportunities open to products which the company can possibly develop.

3. There is no let up in research activity designed to improve the product and to lower the cost of its manufacture.

Applying Merchandising Principles

The importance of research is thoroughly understood by the chemical industries and requires no further mention at this time. Market promotion and its relation to commodity competitions can be mentioned only in passing, although it is a subject deserving even more space than has been accorded it in the technical and merchandising press.

It is true that conditions in no two industries or in fact in no two companies are exactly alike. At the same time certain broad merchandising rules such as the importance of product individuality, apply in all cases and under all conditions. The outstanding problem of the chemical manufacturer today is to create this individuality, and unless he does so, he can expect nothing but increasingly severe competition as time goes on.

The method used depends on the commodity. Where the product is one that retains its original appearance, if not its shape, in subsequent manufacturing operations, and is distinctive enough to be noticed by the consumer, the Bakelite and Cellophane procedure of indirect consumer advertising is undoubtedly best.

This method is expensive, true, but if the initial work is well done, advertising expenditures can be decreased later since the users of the product will carry most of the load. Cellophane was advertised extensively for a short period, and now Cellophane copy is a familiar sight in the magazines and newspapers. The outstanding difference is that, whereas at first all of the advertisements were paid for by Dupont Company, now the Dupont copy is only a small part of the total. In a recent magazine Cellophane was mentioned five times, and in two instances was featured because of its ability to maintain the humidity of the product it wrapped.

The indirect advertising method, effective as it is in the case of Bakelite and the plastics generally, falls short of the desired goal when applied to bulk finished products and to process raw materials which lose their identity in process. One, and perhaps the best remedy in these cases is to extend the manufacturing or merchandising procedure until the product sold will have the desired individuality. This may mean merchandising direct to the consumer particularly if the product is finished and requires only packaging in

small quantities. Borax (20 Mule Team), Oakite, Carbona, Pyrene and Domino sugar are cases in point where a staple product has achieved distinction through the package in which it is sold.

Other products may be given the desired individuality by setting high quality standards and by taking pains to fit the product to individual industrial markets. A quality raw material, custom made for an industrial use, can be trade-marked and will quickly acquire prestige in its markets because its use assures a high quality finished product and a minimum of loss-in-process.

In still other cases it may be necessary to carry the manufacturing process several steps further along the road to the consumer. In the chain of operation leading to dyed textiles we have the producers of coal, of distillate, of intermediates, of dyes, and of dyed fabrics. There is no possibility of imparting individuality to coal, distillate, or to intermediates, but the importance of fast dyes is recognized by the public, and these products can be advertised effectively so that the textile manufacturer will find it profitable to stress the name of the manufacturer or the trademark in his own advertising. Applying this same reasoning to paints we have a step added to the chain in the form of dry color, and this too should be capable of exploitation. There is a vast difference in the ability of paints to remain sun-fast, and the color used in a sun-fast paint is worthy of special mention.

As was mentioned above, conditions vary with different companies but there is no escaping the fact that chemical manufacturers must popularize their products in one or another of the ways mentioned, if they are to avoid cut-throat competition. The life of a patent is short, and competitive laboratories are so prolific, that it is never long before other suitable materials reduce competition to a price basis.

For the manufacturer who would stand apart intrenched behind a stable market, the question is not "Will I popularize my product?" but "How can I achieve the desired result?"

Fertilizer Tag Sales for January in Sixteen States

January tag sales in the 16 tag sale States were only 48 per cent of the sales for January, 1931, and only 32 per cent of those for January, 1930. Ordinarily only about 10 per cent of the year's tag sales are recorded in the month of January.

For the months of December-January combined the tag sales in the 16 States were 56 per cent of those for the same months last year and 39 per cent of those for the same months two years ago. The tag sales for these two months combined ordinarily represent about 12 per cent of the year's total. The sales for January and December-January for the last three seasons are shown in detail in the table below.

The relation of the monthly sales to a full twelve-month period in the 13 southern States is shown in the table below. It is interesting to note that during January, February, March and April the sales average 84.47 per cent of the year's total. The percentages are based upon the sales for the four fiscal years ended with July 31, 1930. It is thought that this table will be useful in gauging the weight to be accorded the monthly sales of fertilizer tags.

Monthly Percentages of Tag Sales

Following is the percentage of tags sold each month in the 13 southern States. Based on the records for the four seasons—August 1, 1926, to July 31, 1930:

	Percentage
January	9.89
February	17.85
March	36.28
April	20.45
Total—first four months	84.47
May	3.92
June	1.30
July	.43
August	1.00
September	2.95
October	2.27
November	1.47
December	2.19
Total—last eight months	15.53
Grand total	100.00

The sales of lime for agricultural use are estimated at 280,000 tons, a decrease of 18 per cent. in 1931 from 1930 (343,111 tons) and following an increase of 1 per cent in 1930 from the 1929 figures. All the States producing lime except two, Florida and Massachusetts, showed decreases from the 1930 production ranging from 5 to 75 per cent in quantity and 8 to 60 per cent in value. In the majority of States the decrease in output was less than the decrease in value.

Fertilizer Tag Sales for Sixteen States for the Month of January and Totals for December-January for Each of the Last Three Years—Short Tons*

	Per cent of	*January*			*Percent of*	*January-December*		
South:	*1931*	*1932*	*1931*	*1930*	*1931*	*1931-32*	*1930-31*	*1929-30*
Virginia†	23.9	10,746	44,996	35,675	25.1	11,296	45,046	38,675
North Carolina	43.5	49,020	112,591	116,412	44.4	53,368	120,296	129,176
South Carolina†	55.7	17,550	31,485	61,785	63.4	23,575	37,185	67,159
Georgia	17.3	5,400	31,122	68,424	17.4	6,121	35,243	69,089
Florida†	120.7	59,894	49,601	75,000	116.4	107,844	92,631	121,800
Alabama	43.6	12,550	28,800	47,700	49.1	14,150	28,800	50,300
Mississippi	40.8	1,000	2,450	54,570	63.2	2,450	3,875	57,077
Tennessee†	11.3	587	5,212	3,675	11.1	587	5,287	3,778
Missouri	4.1	197	4,819	5,016	6.6	321	4,822	5,263
Arkansas‡	16.8	1,400	8,311	13,350	23.7	2,450	10,311	15,083
Louisiana†	55.1	5,280	9,578	23,577	50.6	7,480	14,778	26,057
Texas†	52.8	8,115	5,375	19,480	56.3	9,535	16,940	22,835
Oklahoma	14.1	250	1,775	492	14.1	250	1,775	519
Total South	49.7	171,989	346,115	525,156	57.4	239,427	416,989	606,820
Others:								
Illionois	28.1	1,073	3,819	6,272	28.1	1,073	3,819	6,994
Indiana	6.1	594	9,781	15,300	6.8	694	10,207	16,237
Kansas	....	.....	93	69	164.5	153	93	163
Total Others	12.2	1,667	13,693	21,641	23.3	3,284	14,119	23,394
Grand Total	48.3	173,656	359,808	546,797	56.3	242,711	431,108	630,214

*Monthly records of fertilizer tags are kept by State control officials and are usually slightly larger or smaller than the actual sales of fertilizer. †Cottonseed meal sold as fertilizer included. ‡Excludes 5,130 tons of cottonseed meal sold during January and 10,002 tons sold during December-January combined, but no separation is available for the amount of meal used as fertilizer from that used as feed. The figures shown above in all cases are the latest corrected statistics available.

Lengthening the Life of Wood Employed in Plant Construction

While Mr. H. E. Davis'[1] paper read before the recent "Tappi" meeting in New York deals primarily with the science of preserving wood used in paper mill construction, it applies with equal force to timbers employed in all plants subjected to unusual and difficult conditions.

THE large amount of timber used in the construction of pulp and paper mills especially for roofing makes the question of protecting that lumber from decay an important one. In the handling of wood pulp and paper certain phases of the operations result in warm, damp atmospheres which rise and come in contact with the under side of the roof. This moisture-laden atmosphere results in conditions ideal for decay, which, under the favorable temperature prevailing, advances rapidly. Expensive repairs and even renewals are necessary in short periods of time unless decay-proof construction is used. Proper design is an important factor but can not be relied upon to bring about full protection. The detrimental effect of moisture occurring by reason of imperfect construction, extreme temperature changes, or failure of ventilating equipment to operate at full efficiency is eliminated by preservative treatment. Permanence is thus insured at a negligible cost. Treatment when proper grades of lumber are chosen will add but little to the cost of material, and nothing to the cost of installation.

The Associated Factory Mutual Fire Insurance Companies, after an investigation of a great number of roofs, stated that:

"Decay occurs very frequently in roof timbers and roof plank due to the condition of moisture and temperature to which the roofs are subjected. The average life of untreated and uninsulated plant roofs over highly humidified weave rooms, poorly ventilated paper-machine rooms, and can rooms of bleacheries, is eight to ten years." It is further stated that visits made in 1920 to eighty paper mills disclosed that fifty-three had made or would make replacements of rotted roofs within a year.

The ages of the rotted sections were in some instances as low as five years.

Decay in wood is caused by fungi, a low parasitic form of plant life. Fungus spores which are so minute that they can be seen only with the aid of a microscope are prolific and float through the air often for long distances. Lodging in cracks or crevices of wood where conditions are ideal, they germinate, sending forth filaments which quickly penetrate the wood in all directions. The fungus in its growth breaks down and consumes the wood fibre as food,

This article and the one following are abstracts of two of the most important of the chemical papers delivered before the annual meeting of the Technical Association of the Pulp and Paper Industry in New York City, Feb. 15-18.

[1]Chemical Engineer, Grasselli Chemical Co.

and the wood reaches quickly, that condition known as "rotten."

Four requirements are necessary for fungus growth: viz., air, favorable temperatures, food, which is supplied by the wood itself, and moisture. Removal of any one of these requirements inhibits fungus development and establishes immunity to decay. Temperatures existing in buildings are usually favorable throughout the year. Air can not be excluded, nor can care in construction be relied upon to prevent sufficient moisture to permit fungus growth from reaching the wood. Impregnation with a chemical preservative renders the wood toxic to fungi and insects and thus destroys its food value. Rendering toxic the food supply on which the fungus must depend for food is the basic principle of wood preservation.

Fungus growth takes place at a rather wide range of moisture content in the wood. The most favorable conditions for development occur when the wood contains moisture in amounts of from 30 to 150 per cent. of its bone dry weight. At moisture contents above 150 per cent. development is arrested, but fungi may grow at moisture contents as low as 25 per cent., though germination and development of new plants would be unlikely to occur at the lower figure, all activity ceasing at 20 per cent. Fungi may, however, remain dormant for long periods of time, only to resume activity with the reestablishment of favorable moisture conditions. Slight breaks or imperfections in the water-proofing membranes usually used may admit sufficient moisture to permit decay.

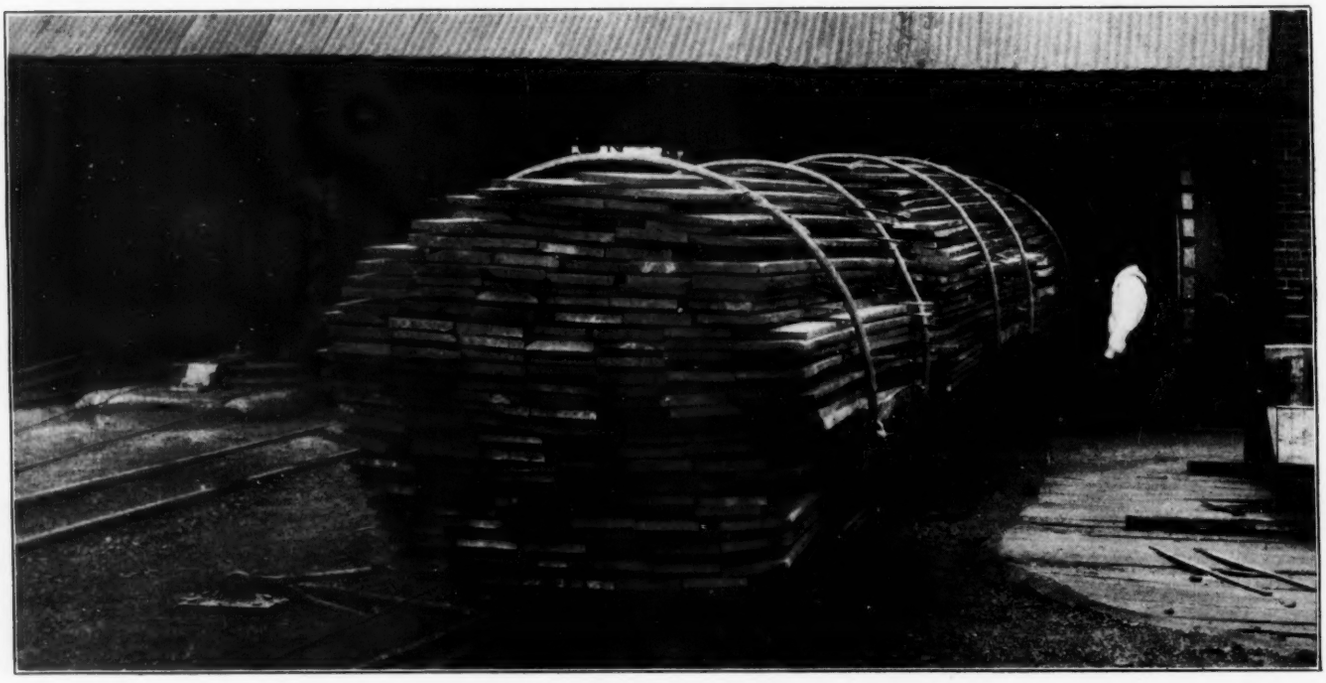
Besides the likelihood of exposure to outdoor influences, atmospheric conditions within the building itself are conducive of decay. In mill rooms of paper mills, the processes involved in mixing and dewatering the pulp, and rolling and drying the paper, give off warm, damp atmosphere which comes in contact with the under side of the roof. Even with the fans and other ventilating equipment operating effectively, condensation may occur at joints or even on the under side of or within the roof.

For mill buildings, types of roof construction which follow recommended practice are designed to prevent condensation at the under side by raising the cool zone where condensation will occur. Proper insulation of the roof slab raises the cool zone until it occurs within the slab itself. A waterproof membrane near the under side of the roof, below the locus of the dew point, is an aid in preventing the penetration of moisture laden air to the zone where temperatures are sufficiently low to cause condensation. Insulation of course is necessary to guard against dripping condensate which might injure the product in the course of manufacture.

Insulating Properties of Wood

Fortunately, wood is not only a desirable supporting medium for the roof but is itself an effective insulating material far more efficient than is generally realized. It has been found that 0.70 is an average figure for the conductivity co-efficient of light woods. An inch thickness of wood then is equivalent, for insulating purposes, to a 7/16 inch thickness of the type of insulating board commonly used. Leaks occurring in the water-proofed top covering may bring about saturation and consequently greatly lowered efficiency of insulating fabric, while the conductivity of wood is only slightly affected by such leaks.

The structural hazard of decay is too great to be



The wood treatment industry has grown only because the economy of preservative measures has been well established

ignored, and every practicable preventive measure should be taken. Inability of roof fastenings to hold in decayed wood increases the possibility of windstorm damage, while sound timber on the other hand not only minimizes the danger from storms or overloading, but possesses a marked fire resistance in comparison with wood in which decay is present. The economic value of the roof which will remain sound and not require frequent repairs or occasional renewals is well recognized.

While proper design and careful construction will provide a well insulated roof, occasional leaks will occur which result in moisture gaining access to the roof. Extreme changes of outside temperatures may also cause a lowering of the cool zone and cause condensation. Skylights and ventilators may often cause rapid rotting in roof sections adjacent to them, since leaks occur and insufficient insulation is sometimes provided. The impracticability of excluding all moisture makes it highly desirable that fungus activities be inhibited by proper preservative treatment.

Leading Wood Preservatives

The two wood preservatives, coal-tar creosote and zinc chloride, considered standards by the American Wood-Preservers' Association, were used for the preservation of over 98 per cent. of the 4,344,000,000 feet of timber subjected to treatment at United States plants during the year 1930. For all roofs where painting is usually desirable, the zinc chloride treatment is recommended, since creosoted material can not usually be satisfactorily painted.

Zinc chloride has no odor and does not discolor the wood, which can after treatment be painted any desired color. Long time commercial installations as well as tests conducted by the Paint and Varnish Association and the United States Government, show in general that wood treated with zinc chloride holds paint equally as well as untreated lumber, if it has been allowed to dry before painting.

Zinc chloride is injected into the wood in solution having a strength of 3 to 5 per cent. Standard specifications of the American Wood-Preservers' Association prescribe for general construction a minimum retention of ½ pound of dry salt per cubic foot of wood. It must, however, be borne in mind that the specified amount is a minimum, and for use where severe conditions exist or decay alone is the factor limiting the service life of the installation, it is recommended that retention of ¾ or 1 pound of dry salt per cubic foot be stipulated. While the minimum amount of preservative will, when injected into the wood, have greater toxcity than is necessary to kill fungi, the larger amounts are advisable in order to secure a better distribution and diffusion of the chemical through the wood, as the excess provides an appreciable factor of safety. The additional half pound of preservative increases the cost of treated material but little, usually by not more than $2.25 per thousand feet board measure.

Lumber treated with zinc chloride has been used during recent years in increasing quantities for mill and building construction. A long list of paper and textile mills have replaced decayed roofs of untreated lumber with zinc chloride lumber, and many mills have been provided with treated timber roofs at the time of construction. While records which establish the exact period of service life that may be expected from zinc chloride treated lumber used in mill roofs are not yet available, an idea of the value of preservative treatment may be gathered from records established in other fields where chemical preservation has been practiced for a longer period of time. It can be stated conservatively that pressure treatment with the recommended absorption of zinc chloride will increase the service life of untreated timber from 3 to 5 times in locations where unusually severe conditions of exposure prevail.

Sap pine posts treated with adequate absorption of zinc chloride were, after 17 years' exposure, found to be perfectly sound, whereas untreated posts set at the same location were badly rotted in 3 years and totally destroyed in 6 years. An inspection in 1930 of experimental ties by the C. B. & Q. Railway disclosed the average life of untreated ties in the experimental lot to be less than 6 years and the average life of ties treated with ½ pound of zinc chloride to be 17½ years. In both these cases timber was in contact with the ground and exposed to rain fall, which must in time cause some loss of preservative. The ties of course were, in addition to direct exposure to the elements, subjected to severe mechanical wear which, rather than decay, is usually the factor which limits the service life of the treated tie used under tracks carrying heavy railway traffic.

Permanence of Treatment

A recent inspection of zinc chloride treated mine props in one of the mines of the Allegheny district showed the timbers to be perfectly sound after 25 years' use. Chemical analyses of random specimens disclosed the presence of sufficient quantities of preservative to insure many more years' service. Conditions of moisture and temperature are such that untreated timbers of a grade and class possessing considerable durability in the natural state have given an average life of four years. In building construction, where timber is protected from direct contact with heavy rainfall or running water, it is generally conceded that the roof built of properly treated timber will have a life equal to that of the ordinary building devoted to manufacturing purposes.

Though the heartwood of the same species may be classed as durable and decay resistant, the same periods of service can not be expected from these species as from properly preserved timber. The decay resisting qualities of different pieces of lumber from the same species vary widely, and even two pieces

cut from the same tree may possess markedly different durability. The sapwood of practically all species has a low resistance to decay and a short life may be expected from sapwood when used in its untreated state under decay producing conditions. Sap edges on lumber having a very high heart content may be attacked by decay, causing weak joints and consequently roof defects which may develop into leaks. Such leaks, by saturating the insulating material and lowering its efficiency, may lower the cool zone and permit condensation at the under surface of the roof.

Use of Sap-Wood Suggested

It must be borne in mind that while lumber cut from sap-wood is not durable in its natural state, it is admirably adapted to preservative treatment and is in no wise deficient to the required structural strength. By treatment, practical permanence is imparted. Moreover, grades of lumber having an unrestricted sapwood content are cheaper than those grades for which practically all heartwood is specified. Satisfactory grades treated with ¾ or 1 pound of zinc chloride per cubic foot cost usually less than untreated grades having sufficient heartwood volume to warrant consideration of their use.

If durability is to be obtained, treatment must be administered by standard pressure processes. The use of the most effective preservatives will not, unless properly applied, bring about greatly enhanced durability. Experience covering a long period of years has definitely established the superiority of pressure processes. Proper penetration and distribution of the preservative are essential if maximum periods of service are to be expected under conditions conducive to decay or insect attack. Where lumber is required in carload lots or greater amounts, the cost of pressure treatment will usually be considerably less than the cost of superficial treatment given on the job, since plants are equipped for expeditious handling.

General Treatment of Wood

This discussion has dealt only with the protection of roof timbers from decay. The use of chemically preserved timber is, however, by no means confined to roof lumber in modern mill construction. Beams and columns frequently collect sufficient moisture, particularly at joints or contact points, to cause decay. Floors often are subjected to conditions conducive to decay. Many subfloors are laid in close contact with the ground. Modern practice sanctions the use of pressure treated timber for all vulnerable units susceptible to decay. While zinc chloride, because painting is usually desirable, is preferred for interior work, both creosote and zinc chloride are widely used for the treatment of subfloors, the choice of preservative depending on the preference of the builder and economic considerations.

The Industry's Bookshelf

Internal-Combustion Engines, by Howard E. Degler, 154 p., illustrated, published by American Technical Society, Chicago, Ill.

A practical text on the development, principles of operation of internal combustion engines.

The Reparation Settlement, by Denys P. Myers, 252 p., published by World Peace Foundation, Boston, Mass. $2.50.

With taxes going higher and a very direct relationship existing between taxes and reparations the business executive interested in business recovery should be acquainted with the subject of international debt settlements.

Future Trading, by G. Wright Hoffman, 482 p., published by University of Pennsylvania Press, Phila. $5.00.

A detailed discussion of a very important but very little understood division of our economic structure.

Pricing for Profit, by W. L. Churchill, 271 p., published by Macmillan, N. Y. $3.00.

Those with a pessimistic or humorous viewpoint might view the subject of Mr. Churchill's book as superfluous at the moment. Yet profits are even more desirable when times are "bad." How to make business profitable—to stockholders, management, employees, and thus to its customers—is to be found in certain economic laws which Mr. Churchill has derived from fifteen years of research and practice as business consultant to ailing industries. A book to read and ponder over NOW.

Chemistry In The Service of Man, by Alexander Findlay, 355 p., published by Longmans-Green & Co., N. Y. $2.50.

A really intelligible summary of general principles and theories of chemical science and of their application towards making this world a better, more comfortable place to live in. An acknowledgment of the indebtedness of mankind to the man of mystery—the chemist.

Principles of Patent Law, by Anthony W. Deller, 483 p., published by Chemical Catalog Co., N. Y. $6.00.

Dr. Baekeland in writing an introduction to this work on patent law states that costly mistakes are often made in protecting millions spent on research. This book gives a very excellent resume of patent procedure for chemists and chemical engineers to follow.

Organic Chemistry, by F. Stanley Kipping and F. Barry Kipping, published by J. B. Lippincott Company, Phila. $3.50.

A completely revised edition of an old favorite organic chemistry textbook. A book of particular value to the beginner.

Forensic Chemistry and Scientific Criminal Investigation, by A. Lucas, 324 p., published by Longmans, N. Y. $6.00.

Describes one of the most exciting sides of chemistry, the tracking down and conviction of the criminal by chemical tests. A real contribution of a part played by the chemist in crime detection. Gives hundreds of test methods.

The Riddle of Economics, by Elisha Ely Garrison, 339 p., published by Macmillan, N. Y. $2.50.

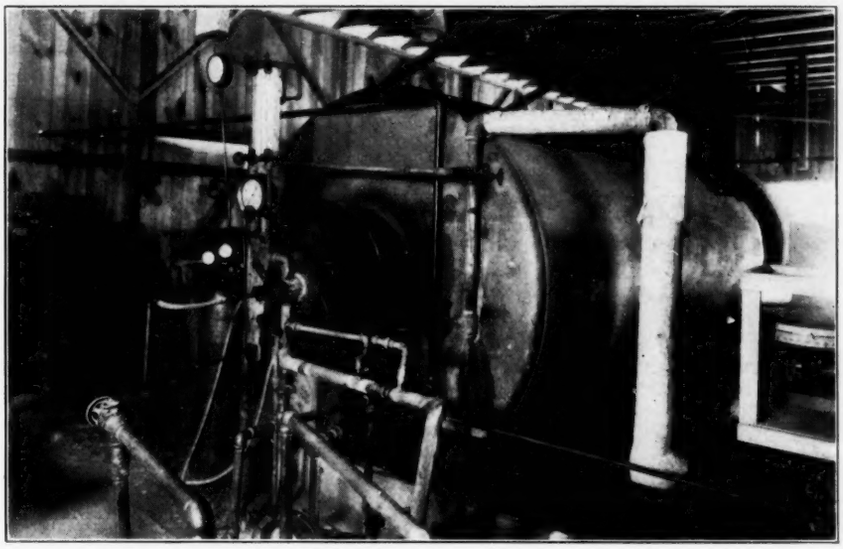
Deals with such interesting and timely subjects as sound vs easy money, credit, unemployment, supply and demand, price, taxes and tariffs, etc. Written in an especially readable manner. A book the business executive will find both enjoyment and profit in reading.

What Price Economic Adjustment ? by James D. Dingwell, 70 p., published by Christopher Pub. House, Boston, Mass. $1.25.

A most unusual treatment of a usually dry subject. A dialogue between a multi-millionaire and a mill superintendent in the lobby of a city club on the machine vs the man. Of more than usual interest at a time when the subject of technological unemployment is of such vital interest.

Ocean Transportation, by Abraham Berglund, 442 p., published by Longmans Green & Co., N. Y. $4.00.

Filled with accurate, modern information directly useful to students of economics and transportation.



A New Sulfur Burner

By Raymond F. Bacon

This new type of sulfur burner is said to offer many economic as well as technical advantages wherever a 19 to 20 per cent strength of SO_2 is required

IT IS the purpose of this paper to describe a sulfur burner which has been developed in the research department of the Texas Gulf Sulphur Company.

This burner has seemed to offer enough advantages as an efficient machine for making sulfur dioxide from sulfur that it has been decided to make it available to the pulp and paper industry. While this burner has been rather thoroughly tested under many different conditions simply as a machine for burning sulfur it has not as yet been installed for a practical test in any sulfite pulp mill, although it is hoped that one or two such installations will be made soon. The burner which has been under test had a maximum capacity of about 13 tons of sulfur in 24 hours, and the advantages claimed for it are as follows:

By its use a gas strength of 19 to 20 per cent sulfur dioxide can be produced and maintained.

No sulfur trioxide is formed.

No sublimation occurs.

It is flexible, burning 6 to 12 tons of sulfur daily, at the same high gas strength.

It can be started after a Sunday shutdown and gas brought to full strength in thirty to forty-five minutes.

It can be started when cold and gas brought to full strength in one and one-half to two hours.

Shut downs are almost instantaneous.

The regulation is simple.

Gas can be delivered to the towers under pressure, eliminating any fan operating in a corrosive atmosphere.

Conversion of sulfur to sulfur dioxide is 99 to 100 per cent efficient.

The construction cost is small.

Operating costs are low.

A waste heat boiler may be installed if desired, and the equipment consists of: A. Steam jacketed nozzle burner, B. Combustion chamber, C. Sulfur melting tank, D. Centrifugal pump equipped with a steam turbine, E. Low pressure blower driven by a variable speed 10 H.P. motor, F.SO_2 gas recorder with automatic control, and G. Compressor or a supply of compressed air.

The burner is made in two parts, one removable, and the other fixed. The removable part of the burner consists of a nozzle and pipe connections, the nozzle itself being constructed from a bar of Alleghany metal approximately 1¾ inches in diameter and 2½ inches in length. At the inlet end it is drilled and tapped to take a ⅜ inch air pipe, while at the combustion end it is tapped to take a tapered plug. Spiral grooves are cut on the outside at the plug end and the molten sulfur is forced into the combustion chamber through these grooves. The plug which is machined with similar spiral grooves, screws into the nozzle. Compressed air admitted through the ⅜ inch pipe is forced through holes in the plug and discharges into the combustion chamber after passing through the grooves, striking and atomizing the molten sulfur issuing from the outside grooves.

The fixed part of the burner consists of a short length (about thirty-six inches) of three inch pipe, which is fastened by a flange to the combustion chamber. Inside of the three inch pipe is a two inch pipe of slightly greater length. The three inch pipe is welded to the two inch pipe at both ends and the annular space between the two is supplied with steam which keeps the sulfur hot and at the same time acts as a cooling jacket to carry off heat from the nozzle. The molten sulfur is fed to the nozzle through the two inch pipe. Running through the two inch pipe and screwed into the nozzle is the ⅜ inch air pipe, which supplies the compressed air to atomize the sulfur.

*Abstract of paper presented at annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 15-18, 1932.

[1] Consulting engineer, Texas Gulf Sulphur Co.

The ⅜ inch pipe and nozzle may be removed as a unit in case it is necessary to clean the spiral grooves. A duplicate unit is provided so that if necessary, replacement can be made, the time required being in the neighborhood of two or three minutes.

The combustion chamber consists of a horizontal welded ⅜ inch steel plate cylinder 8 feet in diameter and 15 feet long. The shell is lined with 2 layers of 1/16 inch sheet asbestos followed by two layers of fire brick suitable for temperatures as high as 1800 deg. C. Two solid baffles and two partitions of checkers work serve to break up the stream of gas and insure thorough mixing.

The melting tank, for a unit burning 12 to 13 tons of sulfur, should be approximately 4 feet x 4 feet x 20 feet long. It is constructed of welded ¼ inch steel plate supported at the top by three ½ inch steel straps and covered with three hinged plates of ¼ inch steel. On the inside are three baffles of ⅜ inch steel, two extending up and one down. The tank is sunk in a concrete pit in the floor below the level of the burner. Steam coils are placed on the sides and bottom of the tank.

The pump used is of the centrifugal type constructed of non-corrosive metal. It is mounted on a vertical shaft driven by a steam turbine equipped with a throttling device to give a wide range of speed.

The blower supplying combustion air is of the Sirocco type having a capacity of 1500 cubic feet per minute against a pressure of 2 inches of water, driven by a 10 h.p. variable speed motor.

The automatic control is operated by a Leeds & Northrup gas recorder. Contacts on the gas analyzer operate a small motor which in turn opens or shuts a steam regulating valve on the sulfur pump.

Compressed Air or Compressor

A source of compressed air or a compressor capable of supplying 25 to 30 cubic feet of free air per minute at 100 pounds pressure.

Sulfur enters at one end of the melting tank, and on melting flows over and under baffles, thus giving ample time for the sulfur to liquify and any impurities to settle before reaching the pump. As the temperature of the molten sulfur is in excess of 140 deg. C. all moisture is evaporated before reaching the pump. The steam in the coils is maintained at a temperature of 148 to 170 deg. C. (50 to 100 pounds pressure) to prevent the sulfur becoming viscous. The foot of the pump is in molten sulfur and the pipe leading to the burner steam jacketed and lagged. As the burner is placed in the combustion chamber at a slight angle and the melting tank is below the level of the burner, on a shut down, the sulfur drains back into the melting tank, thus preventing plugging. The only part which can plug is the nozzle.

The centrifugal pump forces molten sulfur from the melting tank through a short steam jacketed pipe into the burner. The molten sulfur passes in the annular space between the two inch and ⅜ inch pipes, and through spiral grooves, into the combustion chamber in the form of a whirling spray. Compressed air at 90 to 100 pounds pressure passes through the ⅜ inch pipe and the worm grooves of the nozzle plug, meeting and atomizing the sprayed sulfur in the front of the nozzle.

Combustion Air

Additional air for complete combustion enters the chamber at the burner end and under normal operating conditions has a pressure of about two inches of water. Both the amount and pressure of the air delivered, however, can be varied at will within a wide range. The volume of air is measured by use of a standardized orifice and manometer.

While most of the combustion of sulfur takes place in the zone around the nozzle, to ensure complete mixing of the gases and thus avoid sublimation, the gases are passed through two checker work partitions and around two baffles in the combustion chamber. The first checker work is about 5 feet from the nozzle and the second 1½ feet from the exit duct with the two baffles in between. The temperature of the exit gas when burning at the rate of 12 tons per day is around 1200 deg. C. The concentration of gas is maintained within one per cent (19 to 20) by means of the automatic control.

Method of Procedure After Long Shutdown

The operation of the burner is simple. To put in operation after a long shut down with everything cold, the sulfur pump is started and the compressed air valve opened. The whirling spray of sulfur from the nozzle is ignited with a stick saturated with kerosene and inserted through a peep hole alongside of the burner. The blower for the combustion air is then started with the air set for the desired rate of burning by aid of the manometer. The concentration of gas is then raised gradually by regulating the steam on the sulfur pump by hand. For the first 45 minutes considerable attention is required to avoid sublimation but after this period the pump is operated by the automatic control and little attention is necessary. The time required to reach normal concentration is from 1½ to 2 hours.

Starting After a Sunday Shutdown

After a Sunday shutdown (say 32 hours) it is only necessary to start the sulfur pump, compressed air, and blower as the temperature of the combustion chamber (about 500 deg. C.) will be sufficient to ignite the sulfur. The gas concentration can be raised quite rapidly to 19 to 20 per cent that is, in from 30 to 45 minutes without sublimation occurring.

To shut down, the steam on the pump is turned off, the compressed air valve closed, and after a few minutes the blower stopped. The molten sulfur drains from the nozzle and pipe back into the melting tank.

High Per Cent Conversion of Sulfur to Dioxide

As a result of the flexibility of the burner in regard to quick starting and stopping and low losses from sublimation and sulfur trioxide, the conversion of sulfur to sulfur dioxide has been found from numerous tests to be around 99.5 per cent. This is approximately 5 per cent higher than is obtained from the burners of the type in general use in the pulp industry.

The approximate cost of installation has been estimated at about $3500. The cost of operation per day has been estimated at about $2.50 per twenty-four hours.

This cost of operation obviously includes no labor cost, as with the automatic control the burner requires virtually no attention, and it is thought probable that the little supervision it does require would be part of the duties of someone else in the sulfite plant. Labor would also be required to the extent of keeping the melting tank supplied with sulfur. Experience has shown that if the sulfur is clean the nozzle does not become stopped up. In case it does become stopped up the old nozzle can be removed and a new one put in its place in about three minutes.

An idea of the actual performance of the burner was obtained from several runs. The sulfur dioxide content of the gas was checked every five minutes by gas analyses, while sulfur trioxide although tested for once every hour, always gave negative results, and continuous tests were made for sublimed sulfur. The reason that this burner does not give any sulfur trioxide is because of the high temperature of combustion which is beyond the favorable equilibrium range for the formation of sulfur trioxide, and because there is virtually no oxygen left in the gases to allow any sulfur trioxide to be formed when the gases cool to a temperature which would be favorable for the formation of sulfur trioxide. Up to a percentage of 20.2 per cent sulfur dioxide no sublimed sulfur is formed. If it is desired to go higher than that percentage of sulfur dioxide the automatic control is at the present time not sensitive enough to prevent the possibility of the gas at times getting up toward 21 per cent, and there is a liability to form some sublimed sulfur.

During the month (Feb. 6) Italy fixed the quota of nitrates to be admitted free of duty during 1932 at 20,000 metric tons. Of this total, 17,000 tons have been allocated to Chile; 2,000 tons to Germany; and the remainder is divided among other countries. Imports of nitrates in excess of the quota are dutiable at the regular rates of the Italian tariff. Duty-free quota for 1931 was 60,000 tons.

Foreign News

The chief item of news from abroad was the general 10 per cent tax on all goods entering Great Britain placed in immediate effect as the month closed. A few specified articles are exempt but American chemical imports into England will find the new rate a serious handicap in open competition with domestic products specially so with the latter being favored at the moment by the stimulus of the British Industries Fair now open and the "Buy British" campaign. The Chemical Section of the Fair is reported to be well backed by the industry and drawing large crowds.

Numerous rumors are reported concerning supposed agreements in the international dye field. Negotiations are said to be still in progress looking to finally including the British dye industry in the international cartel. The Italian dye firm "Azendi Colori Nazinale Affini," with a capital stock of 60,000,000 lire divided in the proportion of 51 and 49 per cent between the Italian Montecatini and the German I. G. and said to account for 60 per cent of the Italian dye production is reported as having entered the agreement and representatives of the I. G. are said to be on their way to the United States to effect some working basis with domestic producers. Inquiry, however, in offices of dye manufacturers here failed to confirm this dispatch from abroad.

Medley G. B. Whelpley arrived at Santiago, Chile, Feb. 23 to become the new president of Cosach and began immediately his task of finding a solution for the troubled condition of the industry. He planned to begin as soon as possible a series of conferences with Finance Minister Izquierdo, with the hope of working out some formula which would be satisfactory to both the producers and the government.

American nitrate industry was reported during the month to have obtained 25,000 tons of France's total nitrate requirements for the coming year when dispatches (Feb. 3) from Paris stated that Allied Chemical is to send by contract with the French Government nitrates at the same price at which the German Nitrate Cartel recently agreed to sell its products. This price was put at 830 francs a ton to the Comptoir de L'Azote, which would resell to the French farmers at 950 francs a ton.

Canadian Duties on Insecticides

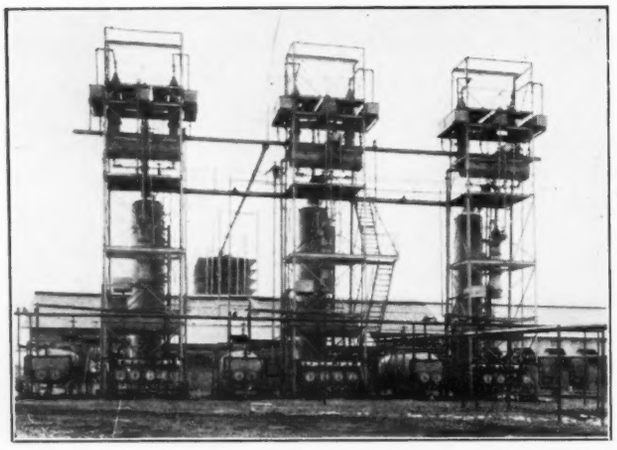
Canadian Customs officials state that finished materials for agricultural insecticide and fungicide spraying are dutiable under Canadian tariff items 219a and 219c, by a recent ruling of the Department of National Revenue. Ruling applies to such articles as lead arsenate, calcium arsenate, lime-sulfur solution, and Bordeaux mixture, whether to be used full strength or diluted.

In Germany competition from carbon black, disorganization of the industry, decreased demand and ruinous decline of prices are given as the chief causes of the failure of August Wegelin A.G., of Kalscheuren, Germany, one of the two largest of the seven producers comprising the German lamp black industry, just reported to the chemical division of the Department of Commerce by the American consul at Frankfort-on-the-Main.

A decree has been issued reducing from 10 to 5 per cent ad valorem the duty levied on the export of platinum from Columbia.

The Spanish National Institute of Physics and Chemistry, on the outskirts of Madrid, was opened during the first week of February by Senior de Los Rios, Minister of Education, in the presence of President Zamora and a number of distinguished Spanish and foreign chemists and physicists. It is one of the finest laboratories of its kind in the world. The cost (£100,000) was provided by the Rockefeller Foundation.

Liquefied Petroleum Gases During 1931



Typical fractionation apparatus by which natural gas is separated into its various hydrocarbon fractions—propane, butanes, pentanes and heavier

An increase of nearly 10,500,000 gallons, representing a gain over 1930 sales of 58 per cent, brought the 1931 marketed production of liquefied petroleum gases to a total of 28,502,819 gallons, according to E. B. Swanson, chief petroleum economist for the Bureau of Mines. The 1931 increase exceeded that recorded for 1930, when marketed production was approximately 8,000,000 gallons higher than in the preceding year.

In two previous surveys, the Bureau of Mines has reported the quantities marketed annually from 1922 to 1930, inclusive, thus giving, with the 1931 survey, a complete record of the marketed production of these gases.

Marketed Production of Liquefied Petroleum Gases 1922-1931

Year	*Gallons*
1922	222,641
1923	276,863
1924	376,488
1925	403,674
1926	465,085
1927	1,091,005
1928	4,522,899
1929	9,930,964
1930	18,017,347
1931	28,502,819

An approximate segregation of the gases marketed indicates that the 1931 distribution of propane was about 15,000,000 gallons, as compared with 11,500,000 gallons in 1930 and that the distribution of butane, pentane and the mixtures of these gases more than doubled, being about 13,500,000 gallons in 1931, as compared with 6,500,000 gallons in 1930. Information assembled in the survey shows that shipments made in cylinders and drums totalled approximately 14,000,000 gallons, while bulk shipments were slightly more than 14,500,000 gallons. Bulk shipments were made by tank truck or car and by pipe line. Some portion of these bulk shipments was used by distributors in filling their own cylinders for local distribution.

Production on the Pacific Coast

Marketed production in the Pacific Coast States, reported by four companies, totalled 5,056,362 gallons, while the marketed production east of the Rocky Mountains, reported by ten companies, totalled 23,446,457 gallons.

Segregation of the 1931 marketed production, according to the three principal types of use, showed that 54 per cent was marketed for domestic uses; 24 per cent for industrial and miscellaneous purposes; and 22 per cent for gas manufacturing, either as a raw material for gas manufacture or as an enriching agent.

Segregation by Uses of 1931 Marketed Production

Use	*Gallons*	*Per Cent*
Domestic	15,294,648	53.7
Gas Manufacturing	6,184,655	21.7
Industrial and Miscellaneous	7,023,516	24.6
Total	28,502,819	100.0

Propane is a gas at atmospheric pressure at such temperatures as may ordinarily be met with, but may be liquefied under moderate pressure and transported in cylinders, drums, or other special containers. It is self-vaporizing at temperatures above minus 44° F. and is the principal constituent of the liquefied gas, commonly designated as "bottled gas," used in the individual installations in homes, clubs, boats and other places unconnected with a central gas supply. It is estimated that approximately 150,000 "bottled gas" customers were served during 1931, as compared with 117,000 during 1930, 55,000 in 1929 and 20,000 in 1928. An average consumption of approximately 100 gallons per installation was indicated.

Markets for Butane

Pure butane is not ordinarily used in "bottled gas" service, as temperatures frequently may be too low to permit the necessary self-vaporation. Butane, consequently, finds its principal market in the industrial fields. The outstanding development in the use of butane has been its application to gas manufacture in central stations in communities too small to support a gas service of the ordinary manufactured type or the distribution of natural gas. In the more common type of central station, butane is mixed with air in determined proportions. Such plants commonly are known as "butane-air gas plants." Some plants, however, distribute undiluted propane. This type of distribution appears to have developed through the experience gained in distributing propane to small groups of houses from a single station.

Through the American Gas Association, it was learned that 118 communities in 28 States were supplied with liquefied petroleum gas by 59 companies at the close of 1931. Undiluted gas was distributed in 24 communities by seven companies, the remainder being butane-air plants. One butane-air plant was reported operating in Canada. In comparison with installations in operation at the beginning of the year, when 59 plants were reported, an even 100 per cent growth is indicated.

Several companies reported an extension of marketing territory during the year. New developments reported include the employment of liquefied petroleum gases in cotton singeing and the use of liquefied petroleum gas as a fuel and refrigerant for motor trucks designed for the transport of perishable commodities.

Four companies began producing and marketing liquefied petroleum gases during 1931, bringing the total number to fourteen, one company previously producing having reported no 1931 production. A list of these producers may be obtained by writing the Petroleum Economics Division, U. S. Bureau of Mines, Washington, D. C.

NEW INCORPORATIONS

Manhattan

Carmoyl Co., chemicals—J. G. Pembleton, 130 West 42nd St. . . . . 200 com
Certified Laboratories, chemical analysis—H. Wohl, 233 2d Ave. . . 10,000 com
S. P. Drummond, wax makers—Lord, Day & Lord, 25 Broadway . . . 200 com
Tulon Products, chemicals—Griggs, Baldwin & Baldwin, 225 Broadway. 2,000

Delaware

Cold Carbonic Corp., New York, carbon dioxide in every form—United States Corporation Co. . . . . $1,000,000 50,000 com,
Dempster Mining Corp., Wilmington, Del., clay, feldspar, mica, metal, coal, other minerals—Corporation Service Co. 10,000
R. A. Josey, Inc., Wilmington, Del., oil, gas, salt, sulphur, other minerals—Corporation Service Co. 500,000
Architectural Magnesite Products, Inc., Philadelphia, Pa., manufacturing, installing composition floors—Corporation Guarantee & Trust Co. . . 322,500

New Jersey

Bullock Magnesium Products Co., Metuchen, manufacture magnesium products—A. D. St. John, New York City $250,000

Chemical Facts and Figures

Chemical Exports Exceed Imports—Copper Leaders Deadlocked—Sisson Walks out of Tappi Meeting—Garner Forecasts Sales Tax—Nichols Estate Appraised—Chemical Employment Declines Further

Foreign trade in chemicals and allied products in 1931 not only reflected world-wide conditions in industry in general but also showed the effects of changes in the world's chemical industry and the lessening dependence of the U. S. upon foreign sources of supply for former essential commodities according to the annual statistics just released (Feb. 8) by the Chemical Division of the Bureau of Foreign and Domestic Commerce, Dept. of Commerce. For the first time since war years, the U. S. recorded a favorable chemical trade balance. Exports valued at $130,645,000 were $12,000,000 greater than imports. Trade both ways showed marked reductions—exports 24 per cent less than in 1930 and imports off 31 per cent.

Exceeds 1921

Exports exceeded the low points reached in 1921 and 1922, but, nevertheless, were smaller than in all recent years, the only other low year of the past decade having been in 1924 when exports were valued at $137,282,000. Imports, however, were the lowest since 1912, not taking into consideration the war period.

U. S. trade in both directions showed greater divergence and variety of commodities traded, with less importance placed on former essential items. In 1931, the 15 leading export items accounted for 65 per cent of the export trade while these same commodities represented 88 per cent in 1927. Conspicuous changes in the imports were the inclusion, among the first 15 imports of 1931, of ammonium sulfate, camphor, sodium cyanide and argols, taking the place of cyanamid, perfume materials, glycerin, and casein.

All major groups recorded declines in values. Of outstanding interest is the fact that exports of chemical specialties and medicinal preparations have been maintained so well in comparison with shipments of other groups, as revealed by the table on the following page.

Benzol, an export commodity ranking eighth and comprising 4 per cent of the total in 1927, dropped to eleventh place in 1931, and accounted for only 2 per cent of the total exports. Quantities dropped 15 per cent, values 43 per cent, and unit price 30 per cent.

Changes in Importance

Changes in relative position and per cent of total of the basic commodities exported may be noted while it is evident that the manufactured products have remained rather constant:

	1927		*1931*		
Item	*Rank*	*Per cent of total*	*Rank*	*Per cent of total*	*Value*
Medicinal prep.	2	11	1	11	15,104
Sulfur	3	9	2	7	9,269
Rosin	1	13	3	6	8,060
Toilet prep.	5	5	4	6	7,402
Paints, lacquers, and varnishes	6	5	5	5	6,743
Blacks, carbon and lamp	11	3	6	4	5,206
Turpentine	4	5	7	4	5,111
Dyes, coal-tar	9	3	8	4	4,739
Phosphate rock	12	19	9	3	4,277
Benzol	8	4	10	3	3,795
Disinfectants, insecticides, etc.	10	3	11	3	3,667
Caustic soda	14	2	12	3	3,465
Borax	18	1	13	3	3,359
Pyroxylin products	17	1	14	2	2,346
Ammonium sulfate	7	4	15	1	2,221

(Value in thousands of dollars).

Items not in the above table which were prominent in 1927, such as coal tar and pitch, zinc oxide, dynamite, superphosphates, and dextrin, have declined so decidedly as to make them of only minor importance. Their places, so to speak, have been taken by chemical specialties and synthetic organic chemicals.

THE MONTH REVIEWED

Mar.

3 France buys American nitrates (263).

8 Chemical exports (1931) exceed imports (265).

15 Tappi holds annual meeting (266).

15 Copper sulfate reduced 35 cents (283).

18 House Military Committee acts on Shoals (267).

20 American Solvents reorganization plans announced (274).

22 I. C. I. announces benzyl cellulose (243).

25 Speaker Garner forecasts manufacturers' tax (267).

29 Nichols estate appraised (272).

Deaths

11 Werner Stauffacher.

23 Dr. Samuel W. Wiley.

Accelerators

Rubber compounding agents such as accelerators and retarders have become prominent during recent years until, in 1931, 2,200,000 pounds ($1,157,000) were exported. Development of rayon has resulted in a demand for many chemicals exported by the U. S. An example is carbon bisulphide, exports of which increased to over 2,000,000 pounds ($125,000).

Chemical Specialties

Some of the other industrial chemical specialties exported in growing amounts likewise are closely related to the textile industry. Over 4,000,000 pounds ($300,000) of textile specialty compounds, which include finishes and bleaches, and 2,000,000 pounds ($200,000) of industrial specialty cleaning and washing compounds were shipped abroad in 1931.

Continued increase in exports of synthetic organic chemicals is noted. Citrate of lime, formerly an import commodity, was shipped abroad to the extent of 5,000,000 pounds ($584,000) in 1931. Other chemicals exported in 1931 were butanol, 861,000 pounds, $104,800; acetone, 3,864,000 pounds, $282,700; ethylene compounds, 718,000 pounds, $127,000; and other synthetic organic products, 2,235,000 pounds, $415,900—an increase of 70 per cent from 1930.

Larger amounts of boric acid, nitro or aceto cellulose solutions, aluminum sulfate, calcium chloride, copper sulfate, sodium borate, sodium sulfate, caustic soda, tin compounds, and gases, were shipped in 1931 in amounts exceeding $500,000 for most of the items mentioned.

Exportation of 65,900 tons ($2,480,000) of nitrogenous chemical fertilizer materials other than ammonium sulfate, which class includes chiefly synthetic sodium nitrate, was reported. This class, with potassium chloride exports of 27,900 tons ($1,230,000) and concentrated chemical fertilizer exports of 33,400 tons ($1,288,000)—both developments of recent years—partially offset the losses in other fertilizer materials.

Leading Imports

The 15 leading chemicals imported in 1931, which accounted for 63 per cent of the total imports, are a little different

United States foreign trade in chemicals and allied products in 1931
(In thousands of dollars)

Item	Exports 1930	Exports 1931	Imports 1930	Imports 1931
Total	171,727	130,645	172,007	118,234
Naval stores, gums, and resins	22,697	14,303	21,450	13,128
Crude drugs and botanicals	2,576	2,413	7,678	5,925
Essential oils	1'993	1,472	5,643	3,654
Coal-tar products	17,556	10,347	16,273	11,163
Dyes	6,246	4,739	5,284	5,512
Medicinal and pharmaceutical preparations	17,801	15,104	4,948	3,973
Industrial chemical specialties	15,589	13,754	23,300	17,199
Industrial chemicals	23,015	19,774		
Pigments, paints, and varnishes	21,689	15,127	2,613	2,017
Fertilizers and fertilizer materials	15,284	13,011	59,151	44,733
Explosives and fuses	2,950	1,734	105	132
Soaps and toilet preparations	13,970	11,283	4,719	3,028

from the 15 leading items imported in 1927, as revealed by the following table:

Item	1927 Rank	1927 Per cent of total	1931 Rank	1931 Per cent of total	Value
Sodium nitrate	1	15	1	18	21,112
Potash fertilizers	3	7	2	10	12,237
Crude drugs	7	5	3	5	5,925
Dyes	9	3	4	5	5,512
Tung oil	4	6	5	4	4,426
Medicinal prep	12	2	6	3	3,973
Essential oils	8	3	7	3	3,654
Creosote oil	2	8	8	3	3,598
Ammonium sulfate	..	0.4	9	3	3,142
Lac and shellac	5	5	10	2	2,886
Medicinal and food gums	14	2	11	2	2,335
Camphor	16	1	12	2	1,849
Sodium cyanide	20	1	13	1	1,711
Varnish gums	6	5	14	1	1,688
Argols	21	1	15	1	1,605

(Value in thousands of dollars).

Creosote oil, in 1927, held second place with a total receipt of 95,900,000 gallons ($15,400,000) and in 1931 eighth place with 36,900,000 gallons ($3,600,000). Creosote oil is now being exported, with 1,900,000 gallons ($254,000) shipped out of the country in 1931.

Decreased receipts of lac, shellac, and other varnish gums may be explained by both diminished demand from domestic consumers and the substitution of synthetic products.

Camphor has advanced in relative importance, owing to a smaller percentage reduction in price and to increased demands of domestic industry. Figures of imports in these two years were: In 1927, natural crude camphor, 1,690,000 pounds ($810,000); refined camphor, 1,481,000 pounds ($823,000); and synthetic camphor, 2,934,000 pounds ($1,263,000); in 1931, natural, crude, 2,010,000 pounds ($716,000); natural refined, 1,152,000 pounds ($545,000); and synthetic camphor, 1,798,000 pounds ($588,000).

Copper Meeting

Conferences of world's leading copper producers failed to produce an agreement on further curtailment of production and on new rules for Copper Exporters, Inc., which controls the sale of the metal abroad.

A proposal has been made to leading producers for further cut of a third in production. Since rate of output for entire industry was established at 26½ per cent of capacity last December, proposed reduction would make the operating rate about 17½ per cent of capacity.

American producers would agree to the lower mark, it was said, if special privileges of the Belgian Katanga, were canceled. Under December's agreement Katranga was permitted to produce and impound approximately 66,000,000 pounds of copper, in addition to the 115,000,000 pounds a year that represented 26½ per cent of the company's annual estimated capacity of 432,000,000 pounds. This concession sent Katanga's yearly output up to 181,000,000 pounds, of which only 115,000,000 could be sold.

American producers feel that it is useless to agree to additional cuts in output so long as the surplus impounded copper is overhanging the market. Several executives are said to be in favor of a free market for copper as the speediest correction of the industry' excessive production.

DuPont Patents

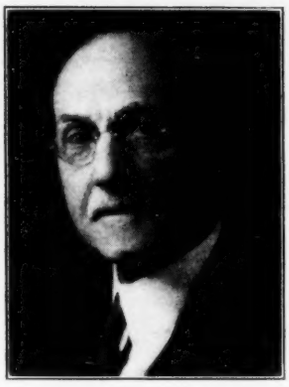
Du Pont announced Feb. 26 that in a search of its own records relating to the development of the use of solvent softeners, as covered by U. S. Patent 1,710,453, it found a sales bulletin issued under date of Oct. 4, 1921, which indicates that one particular clear lacquer containing solvent softener was technically placed on sale as of that date. As the application for Patent No. 1,710,453 was filed on Oct. 13, 1923, nine days more than two years after the date of this Sales Bulletin, some doubt as to the validity of that portion of Patent No. 1,710,453 covering clear lacquers has arisen. Notice has accordingly been served on the defense of the intention of the du Pont Company to withdraw this patent without prejudice from the pending litigation against the Glidden Company and ask the Patent Office to reissue this patent on the basis of the claims not affected by this technicality.

Meanwhile it is intended to proceed with the pending litigation on Reissue No. 16,803, the status of which is not affected in any way by this development on Patent No. 1,710,453.

Government methods to restrict industrial alcohol to lawful use and prevent diversions to illegal channels, are outlined in a publication, "Facts Concerning Industrial Alcohol" made public by J. M. Doran, Commissioner of Industrial Alcohol.

Stormy

George W. Sisson Jr., president of the Racquette River Paper Co., a past president of the American Pulp & Paper Association and a member of its advisory council, abruptly resigned and walked out of the meeting when the association rejected a resolution he offered.



George W. Sisson, Jr.
Throws a bombshell into Tappi Meeting

Mr. Sisson's resolution called for study of the international financial dislocation brought about by abandonment of the gold standard, and of efforts being made to deal with this situation. He urged adoption of the resolution in a speech in which he pictured the distress of unemployed mill workers in his own town of Potsdam, N. Y.

It was understood that he referred to the differences between domestic wood-pulp mills, which would like a protective tariff against foreign dumping, and the group of converters who oppose a tariff on the ground that it would shut off their annual imported supply of 1,500,000 tons of chemical wood-pulp and force scores of converter plants to close their doors.

Mr. Sisson was later quoted as saying "I may have acted a little hastily, but I stand by what I did," declaring that the time had come for the association to think in terms of the industry as a whole and not in terms of groups whose interest did not go beyond their own problems.

Fly-Spray Standards

Insecticide and Disinfectant Manufacturers' Association Committee on insecticides suggested a standard for liquid fly-sprays. In a report submitted by Charles P. McCormick, chairman of the committee, the proposed standard is stated as follows:

All liquid spray manufactured by members of the Insecticide and Disinfectant Manufacturers' Association for household use, must show a 95 per cent down and at least 60 per cent kill on flies by the Peet-Grady method. In addition, the base should exceed 120 degrees flashpoint and should not be referred to as kerosene, kerosene petroleum, or petroleum insecticide base in the future, but as a hydro-carbon distillate base.

Washington

The most important news to chemical manufacturers coming out of the Washington grist mill was not chemical in nature at all, but had to do with Speaker Garner's statement (Feb. 25) forecasting the passage of a manufacturers' tax within ten days. Said the leading Democratic spokesman: "It got to the point," Garner explained "where we found we had to resort to such a tax to get enough revenue to balance the budget. We found that excise taxes considered would have produced only $400,000,000 revenue, and we needed $800,000,000 from such a scource to supplement increases in income taxes, inheritance taxes and a gift tax."

Muscle Shoals

On Muscle Shoals, the last word was an approval (Feb. 18) in principle by the Military Committee of the House of legislation providing for a lease of the properties for fertilizer production and for Government operation in case of failure to negotiate a lease. A subcommittee to draft a bill was appointed, to which were referred the dozen or more Muscle Shoals bills already before the committee, but it is likely that an entirely new bill will be written. Subcommittee is composed of Representatives Lister Hill, Ala., N. F. Montet La., James M. Fitzpatrick, N. Y., and Jed Johnson, Okla., Democrats, and W. Frank James Mich.

Tariff Commission

Tariff Commission approved plans for work in Argentina in connection with the costs of production of flaxseed and casein, subjects of investigations under Section 336 of the Tariff Act of 1930. Flaxseed investigation was ordered in response to application from Association Nacional de Agricultura, of Argentina, and the casein investigation was ordered in compliance with a resolution passed by the Senate.

Commission also announces that applications recently received from the Monite Waterproof Glue Co., Minneapolis, and Centro de la Industria Lechera, of Buenos Aires, requesting decreases in the rate of duty on casein, have been merged with pending investigation.

I. C. C. Rulings

The I. C. C. held as unreasonable the maintenance of intrastate rates on mixed fertilizer and fertilizer materials in Mississippi lower than the interstate basis. This was held to be unduly prejudicial to interstate commerce and rates were ordered increased to a level equal to those applicable to interstate shipments. Maintenance of rates on this traffic moving in locahauls in the portion of Louisiana east of the Mississippi River was found not unduly prejudicial to interstate shippers.

COMING EVENTS

American Chemical Society 83d meeting, New Orleans, March 28-April 1.

American Drug Mfrs. Association, Greenbrier, White Sulphur Springs, Apr. 18-21.

American Institute of Chemical Engineers, spring meeting, Schenectady and Corning, N. Y., June.

American Leather Chemists' Association, Atlantic City, May 25-27.

Electrochemical Society, Spring Meeting, Baltimore, Apr. 21-23.

National Petroleum Association, Semi-Annual Meeting, Hotel Cleveland, Cleveland, April 21-22.

N. Y. Board of Trade, Drug & Chemical Section, dinner March 15, Hotel Commodore.

New Fertilizer League

West Coast Fertilizer Tariff League has been formed with headquarters in the Exchange building, Seattle, Wash. Officers of the league are:—President, John Stauffer, Jr., Stauffer Chemical; vice-president, J. C. Baldwin, Agricultural Chemical Works, Los Angeles; executive secretary, Floyd Oles, Exchange building, Seattle. Legislative committee of fourteen members is headed by Lee Van Derlinden, U. S. Metals Selling Co., Chicago.

Personnel

Charles P. Gulick, general sales manager, National Oil Products elected president. He succeeds Mark A. Richards, who retired because of ill health. Mr. Richards has been chosen chairman of the board, a newly created office.

Charles P. Gulick
Long service rewarded

Mr. Gullick has been treasurer of the company since its incorporation in 1907. He was recently elected president of the newly organized Sulphonated Oils Manufacturers' Association.

Ernest B. Miller, brother of president, C. Wilbur Miller, Davison Chemical, and one of the vice-presidents of the company, transferred from Davison company to Silica Gel and Harry Taylor, superintendent of the phosphate department for about twenty years, presented his resignation, which was accepted.

George P. Dunn, former treasurer of Smith & Nichols, elected president of the company to succeed the late George O. Ellmore. Charles Christmann appointed vice-president and treasurer. E. M. S. Murray, a former director of the company, is now secretary.

Henry A. Wiedman, manager, chemical division, Schering Corp. for the past three years, severs this connection April 1. Mr. Wiedman has been in the drug and chemical trade fifteen years. Prior to his present connection he was nine years with E. Fougera & Co., Inc. and three with McKesson & Robbins, Inc.

Chas. S. Glicksman joined laboratory staff of Glyco Products, Brooklyn, N. Y. He will devote most of his time to special emulsion work for the leather, food, cosmetic, textile, rubber, and paint industries.

William J. Lawrence, president, Paper Makers Chemical, a unit of Hercules Powder, elected director of the Hercules Company. He will fill vacancy caused by death of F. W. Spark.

Harlan A. Depew, formerly chief, rubber research section, N. J. Zinc, accepted research position with American Zinc Sales, Columbus, Ohio.

Samuel Marcus added to Michigan Color Works, 9001 Oakland Ave., Detroit, as partner of Max Hoberman.

Jules L. Bauer, secretary-treasurer, North Bergen Varnish, North Bergen, N. J., announced that William J. Takes has been appointed to company's industrial sales division in the metropolitan area.

Dr. Dale S. Chamberlin, associate professor, industrial chemistry and chemical engineering, Lehigh joined research staff, National Oil Products.

Horace Hammond elected president, Alabama By-Products, Feb. 12. Mr. Hammond, who has been an official of the company since its founding twelve years ago, succeeds late Morris W. Bush. The only other change in company's personnel was election of John W. Porter to the board of directors.

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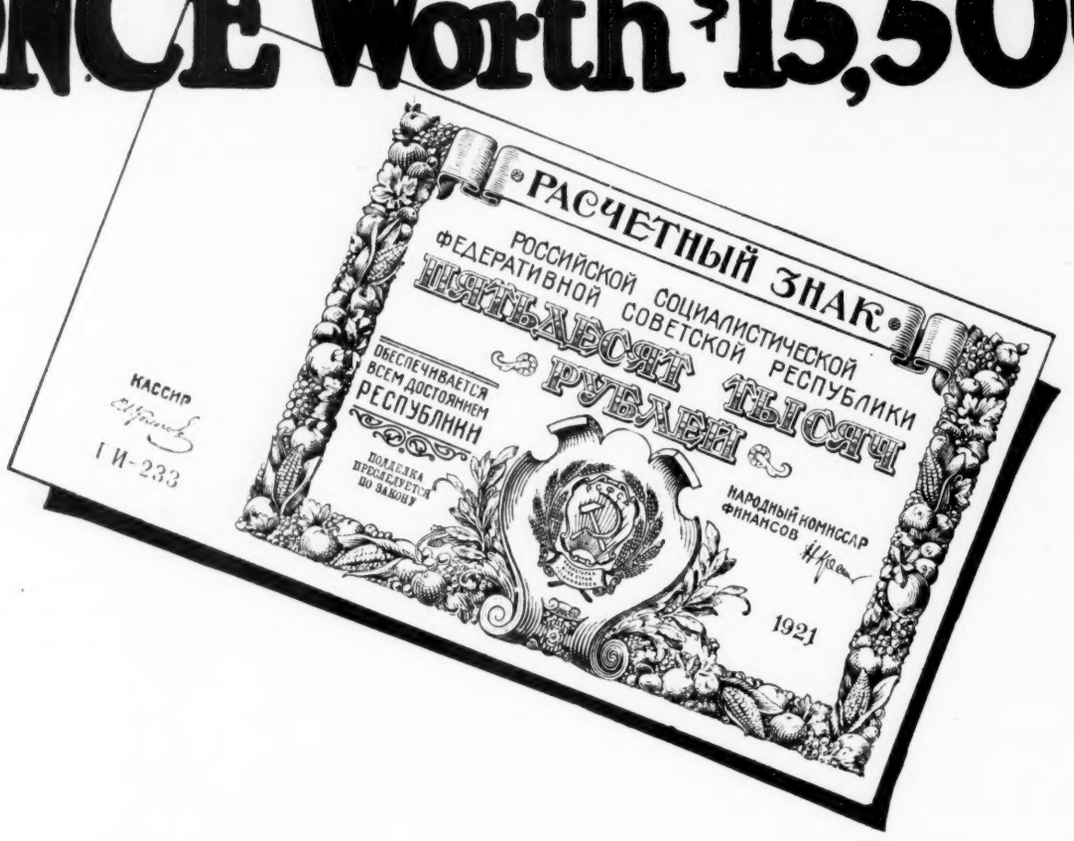

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Company News

Ideal Chemical Manufacturing Co. organized at Buffalo, N. Y., to establish and operate a plant for the manufacture and distribution of chemicals and chemical products.

Gillespie-Rogers-Pyatt moved from 99 John St. to the twenty-third floor of 80 John St.

Truempy, Faesy, & Besthoff are now located on third floor of 22 East 40th st., N. Y. City. Firm's new telephone number is Lexington 2-1090.

Givaudan-Delawanna completed a new perfume oil of the Fougere type that can be used in all cosmetic and toilet preparations. New product is a ready to use perfuming oil and is said to have all necessary fixatives and other ingredients necessary to produce a finished perfuming oil. From experiments it has also proved satisfactory in face creams and powders.

Calco Chemical purchased alkali blue and iridine violet business of Zinsser & Company, including equipment, processes, formulae, good will, etc. For the present, production will continue at the Zinsser plant in Hastings, N. Y., and the same exact types will be produced under the same personnel as heretofore. As soon as a safe reserve stock of all qualities has been accumulated, equipment will be moved to main Calco plant at Bound Brook, N. J., and production carried on at that point.

Aluminum Industries, Inc., developed preservative for metals, stone, wood, fabric or any combination of these materials which is heat-resisting, non-corrosive and weatherproof. New product, called Permite Resalum, was developed from a synthetic resin.

Rustless Iron Corp of America reported suit brought against it in 1929 by American Stainless Steel in which infringement of the Haynes patent was alleged has been dismissed through motion brought by plaintiff.

Paul Uhlich & Co., leased for executive offices fourteenth floor in the new Bertrand Bldg., 157 Chambers St.

Hartmen Chemical Co. organized, with offices at 2005 West 22nd st., Chicago, to deal in chemical products.

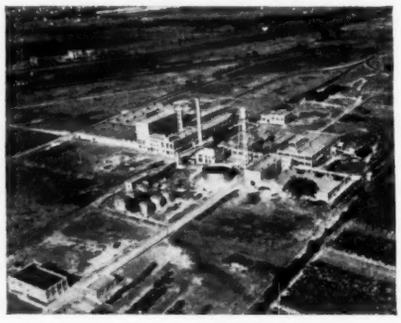
New York Quinine & Chemical Works, telephone changed from Greenpoint 9-10200 to Evergreen 6-2600.

Atmospheric Nitrogen, Hopewell, Va., increased production with another unit of the plant being placed in operation. A total of three units are now working.

Philadelphia Quartz last month mailed several thousand sealed Cellophane envelopes containing Metso Crystals, a new commercial form of sodium metasilicate for cleaning purposes. Each envelope contained five grams of the product and was pasted to a card describing the product and providing directions for a test.

Planters' Fertilizer, at Charleston is expected to open old Chiquola Fertilizer Co.'s plant within the next few weeks, according to an announcement by H. N. Wright, manager.

Indocyanine B A is a new acid dyestuff, manufactured by General Aniline, and offered to trade by General Dyestuffs.



Bakelite's newly completed plant at Boundbrook, N. J., as seen from the air

Harshaw Chemical established a special department at Philadelphia to care for requirements in quantities less than usual units. Company has prepared a small package price list of standard industrial chemicals in quantities and packages convenient for experimental, research, and small-scale manufacturing purposes.

Hummel & Robinson filed petition in bankruptcy. Liabilities were understood to have been $56,579, with assets of $42,821. Creditors include Continental Bank and Trust Co. of N. Y. for $16,821, all of which is secured. Other creditors are Adolph Hess & Brother, Ltd., Leeds, England, for $3,500, and John H. Gardthausen for $3,775.

Clarence Morgan & Co., Chicago, moved its general offices and warehouse and is now located at 411 West Ontario Street.

United Color and Pigment moved its Chicago offices to Builders Bldg., 228 No. La Salle St.

Announcement is made of opening of new chemical plant in the Shawinigan Water & Power Co.'s district. New company, Ultra Chemicals Co., Ltd., is now associated with Ultra Chemicals Co. of Hawthorne, N. J., the president being William S. Spuhler and the treasurer Dr. Ruegg.

Linde Air Products introduced a new series of welding heads with detachable tips for use with the Oxweld Type W-17 Welding Blowpipe. These will supplement the one-piece style heads for this blowpipe, so that the user will have a choice of two types of welding heads. The new detachable tip heads were developed particularly for pipe line welding and for production operations. The new tip produces the same type of flame as that produced by the one-piece welding head for the Type W-17 Blowpipe. Sizes Nos. 6 to 13, inclusive, are available in the new welding heads. One of the practical features of the new design is the very satisfactory connection between the tip and the stem provided by the male thread on the tip which screws into the stem. Removal or replacement of the welding tip is thus greatly facilitated.

Seal Chemical Process Co. organized at Detroit to manufacture and deal in chemicals.

American Aniline Products, Inc., moved to 50 Union Square. New telephone number is Stuyvesant 9-7600.

Du Pont Cellophane at Buffalo will increase production approximately 50 per cent. New machines are larger and faster, and it is expected production costs will be considerably reduced.

A. Gross & Co., formerly located at 90 West St., N. Y., removed to 122 E. 42nd St.

The Swift Canadian Co., Ltd., meat packers, leased premises on St. Helens avenue, Toronto, according to an announcement of the Toronto Industrial Commission, and will manufacture "Vigoro." Operations are scheduled to commence March 1, and approximately 95 per cent of the raw materials used in the manufacture of the fertilizer will be of Canadian origin.

Beeswax Laboratories, Inc., with headquarters at 341 Twentieth street, Toledo, Ohio, organized to manufacture wax finishes and preservatives for wood, metal and leather.

National Lead announced a soft paste white lead in oil, which up to date had only been put up in cans minus turpentine, will now be available with 2 per cent turpentine. To a certain line of consumers this innovation will prove welcome. The older product without turpentine will still be available.

Drackett Chemical appealed, Feb. 16, an adverse decision in a patent suit involving a heat-generating compound to the U. S. Circuit Court of Appeals in Cincinnati.

George Uhe, Inc., brokers, moved on Feb. 27 from 11 Cliff street to larger quarters on the 21st floor, 102 Maiden lane.

Personal

Honored. Francis P. Garvan, head of the Chemical Foundation, has been made a Knight of the Legion of Honor of the Republic of France. The French ambassador bestowed the decoration at a private dinner.

Honored. Arthur S. Somers' memory will be recalled in future years by a bronze memorial tablet unveiled Feb. 28 in Shaari Zedek Temple, Brooklyn, N. Y. The ceremony was attended by public officials and civic leaders.

At a special meeting of the board of directors, Fred L. Lavanburg Co., held Feb. 23, Andrew L. Somers was elected president succeeding his father.

Eiected. Officers elected for the coming year was the principal business transacted at the annual meeting of the United States Shellac Importers' Association. William H. Zinsser of William Zinsser & Co. was elected president; Louis Gillespie of Gillespie, Rogers, Pyatt vice-president, and L. W. Babbidge of Henry W. Peabody & Co. secretary. The following were elected directors: James W. Byrnes of the James W. Byrnes Sales Corporation, A. G. Lerden of Alfred Kramer & Co., R. W. McClintock of the Mac Lac-Kasebier-Chatfield Shellac Co., R. S. Rosen of the Mantrose Corporation, J. R. Anderson of Argenti & Co. and Phillip M. Rowe of Phillips & Rowe. New committees will be appointed at the next meeting.

Married. John Jay Schieffelin, son of William Jay Schieffelin, president, Druggists' Supply Corporation and N. Y. City civic leader married to Miss Lois Linden Smith March 11.

Recovered. Arthur C. Bate, secretary, Kalbfleisch Corp. from an illness of two and one-half months.

Killed. George I. Anderson, representative of the Cleveland office Imperial Color Works, was killed by a train in Charleston, W. Va., February 2. His father Frank A. Anderson, is manager for Imperial in San Francisco.

Died. Werner Stauffacher, chairman of the board of directors, Sandoz Chemical Works. Mr. Stauffacher died in Switzerland. Mr. Stauffacher was among those aboard the Graf Zeppelin on its first trip here.

Died. Gilbert A. Bragg, 41, general manager, Koppers Research, and recognized authority in hydrometallurgy and a skilled chemist, following attack of influenza, Feb. 2. He was a native of St. Joseph, Mo., and a graduate of University of Kansas. His widow and a son survive.

Died. George O. Elmore, 51, president Smith & Nichols, Inc., unexpectedly, Feb. 8, in Orange, N. J.

Died. Ralph L. Fuller, president, Ralph L. Fuller Associates, and former vice-president, Harshaw, Fuller & Goodwin Co., which became Harshaw Chemical Co., Cleveland, died Feb. 17 in Euclid, Ohio, following a long illness.

Died. Leonard Richards, 71, chemical manufacturer, suddenly at his home in Havre de Grace, Md. He was a member of the Larchmont and Havre de Grace Yacht clubs.

Died. Dr. William P. Headden, 81, chief chemist, Colorado Experiment Station, and for many years professor of chemistry at the State Agricultural College, Feb. 5.

Died. Dr. Samuel William Wiley, 53, president and general manager Wiley & Co., analytical and consulting chemists, Baltimore, Feb. 23 at his home in Ruxton, near Baltimore, Md. He received his education at the Massachusetts Agricultural College and Boston University, he became in 1898 assistant chemist at the Massachusetts State Experiment Station where he remained until 1902 when he joined Bowker Chemical as chemist, later becoming chief chemist for A. A. C. at Baltimore.

In 1906, Dr. Wiley established his own analytical laboratory under the firm name, Wiley & Co.

President Amos L. Beaty, American Petroleum Institute delivered an address before the annual banquet of the California Oil and Gas Association held at Los Angeles.

Dr. H. H. Sheldon, physicist and engineer, elected president, American Institute of the City of New York. He succeeded A. Cressy Morrison Carbide & Carbon who was elected to the Board of Trustees. The other officers elected were Dr. Otis W. Caldwell, vice-president; Dr. William Crocker, secretary; Mr. Alfred Knight, treasurer.

D. F. Cranor, New York manager of the service and control division, Binney & Smith addressed Chicago Production Men's Club at its meeting at the Medinah Athletic Club, Feb. 15.

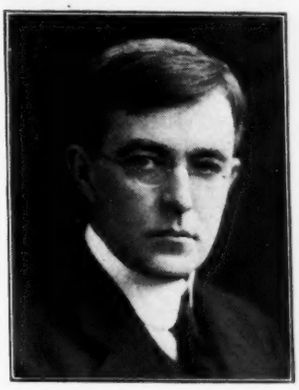
B. G. Klugh, vice president of Swann Research, Inc., described the new Swann 64 per cent fertilizer at a meeting of the American Institute of Chemists held at the Chemists' Club Feb. 8.

Federal Trade Commission appointed Ishmael Burton as its chief examiner to succeed the late Herbert L. Anderson. Mr. Burton had been assistant chief examiner since 1928.

J. W. Cronin, Krebs Pigment, was the speaker at meeting of the Louisville Paint Production Men's Club, Louisville, Feb. 18. Mr. Cronin spoke on lithopone.

Awarded Medal

Dr. Irving Langmuir, associate director, research laboratory of General Electric presented at a luncheon at the Engineers'



Dr. Irving Langmuir
Another in a long series of honors

Club, with gold medal, an honorarium of $10,000 and a certificate, offered by *Popular Science Monthly* as an annual award for notable scientific achievement by an American.

James G. Vail, Philadelphia Quartz chemical director addressed, March 8, meeting of the Indiana Section of the A. C. S., on "Soluble silicates and their application in industrial cleansing processes".

E. R. Weidlein and Wm. A. Hamor director and assistant director respectively of Mellon Institute, made members of the Greater Pennsylvania Council by Governor Pinchot.

Clarence K. Simon, formerly president and general manager, Dye Products & Chemical, and lately connected with Calco Chemical, is now engaged in consulting chemical engineering practise.

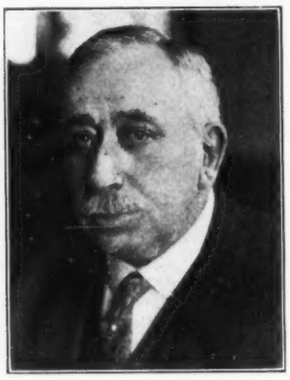
Walter F. Dingley severed his connection with Pacific Coast Borax and has been elected secretary and treasurer United States Potash Co.

Sheldon, Morse, Hutchins and Easton, recently formed to handle industrial marketing and the economic problems connected with scientific industrial research, moved its offices to the Graybar Bldg., 420 Lexington Ave., N. Y. City.

Herman Frischer Chemisch-Technisches Buro, Berlin, Germany, has, after twenty years of successful operation all over Europe, established a branch office in this country under the name of H. H. Frischer & Co., 24 Monroe Place, Brooklyn, N. Y., as consulting engineers for the Heavy Chemical Industry. Dr. K. F. Sonnenstuhl is the resident manager of this office."

Appraised

Estates of two former outstanding members of the industrial chemical industry were filed for appraisal purposes during the past month. New York University received $3,670,401 under the will of Dr. Nichols. The estate of Dr. Nichols was appraised for transfer tax purposes at $9,647,629 gross and $9,137,140 net.



The late Dr. Wm. H. Nichols

Dr. Nichols, for many years before his death, was a liberal contributor to the university, always being deeply interested in his chemistry department. In 1925 he donated $600,000 to erect a new chemistry building, now known as the Nichols Chemistry Laboratory, and in 1929 he gave $250,000 to be applied toward the construction of the university's School of Education.

Other public bequests made by Dr. Nichols were Polytechnic Institute, Brooklyn, $250,000; American Board of Commissioners for Foreign Missions, Boston, $100,000; each of the following, $50,000, American Chemical Society, Congregational Home Missionary Society, American Missionary Association, Brooklyn and Queens Young Men's Christian Association, American Society for the Control of Cancer and the International Committee of Young Men's Christian Associations. The Brooklyn Eye and Ear Hospital, Brooklyn Bureau of Charities and the American National Red Cross received $25,000 each.

Individual Bequests

The largest individual legacies under the will of Dr. Nichols went to Mrs. Medeleine Nichols Sharp, of Coronado, Calif., daughter, and C. Walter Nichols, of West Orange, N. J., son, who received $1,495,988 and $1,546,230 respectively, the son and daughter also receiving personal effects valued at $140,249 each. Mrs. Rose T. Nichols, of 290 Park Ave., N. Y. City, widow of William H. Nichols, Jr., son of Dr. Nichols, and her two children, Francis Tilden Nichols, of Oyster Bay, L. I., and Mrs. Marian Nichols Viles, of 290 Park Ave., share in $1,499,239, and also received some personal effects.

Philip Schleussner former vice-president of R. & H., left an estate appraised for taxation purposes in New York State at $1,588,378 gross and $1,371,201 net. The only taxable property situated in New York State was personal effects at the Hotel Gladstone, valued at $2,785.

The late Philip Schleussner

Mrs. Matilda Schleussner, the widow of Newfield Ave., Stamford, Conn., receives the income from one-half the residuary estate, and Geraldine B. I. Schleussner and Charles Edward Schleussner, children, receive each the income from one-fourth. Mr. Schleussner's holdings in E. I. du Pont de Nemours Company common were valued at $1,463,414.

Employment

Employment and payroll totals in the manufacturing of chemicals and related products declined further during January.

	Employment		
	Jan., 1932	Dec., 1931	Jan., 1931
Chemicals	89.9	91.0	101.5
Fertilizers	51.2	48.5	73.5
Petroleum refining	67.2	67.3	81.0
Cottonseed oil, cake, and meal	45.5	53.7	87.8
Druggists' preparations	80.7	80.4	84.9
Explosives	86.8	89.9	110.4
Paints and varnishes	73.4	74.7	81.0
Rayon	149.9	147.9	137.3
Soap	95.9	97.7	98.9

	Payroll totals		
	Jan., 1932	Dec., 1931	Jan., 1931
Chemicals	71.1	75.1	85.7
Fertilizers	40.6	41.2	66.6
Petroleum refining	62.5	64.2	81.8
Cottonseed oil, cake, and meal	49.0	60.7	81.4
Druggists' preparations	82.8	87.0	95.0
Explosives	56.0	67.2	76.5
Paints and varnishes	63.2	67.3	77.9
Rayon	128.5	132.7	141.2
Soap	87.9	90.5	109.7

George C. Lewis, president of the Chemists' Club; Charles H. Herty, industrial consultant; Edward R. Weidlein, director of the Mellon Institute; Daniel D. Jackson, head of the Department of Engineering, Columbia University; J. P. H. Perry, representative of the Engineering Societies Unemployment Committee, and William Hodson spoke at a mass meeting (March 4) held to consider unemployment in the chemical engineering profession.

Statistics of Operation and Production in Chemical Industry*

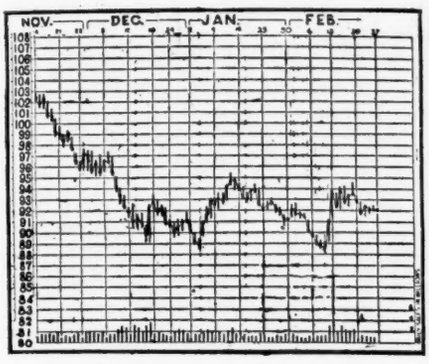
Year and month	General operations: Employment F. R. B. Indexes: Adjusted	Unadjusted	Pay rolls, unadjusted	Stocks: Manufactured goods	Raw materials	Ethyl alcohol	Explosives	Rosin, wood	Turpentine, wood	Superphosphates	By-product coke	Arsenic, refined	Fertilizer	Potash salts	Nitrate of soda
						Production							Consumption	Imports	
	Monthly average, 1923-1925=100					Thous. of gals.	Thous. of lbs.	Barrels		Thous. of short tons		Short tons	Thous. of short tons	Long tons	
1929: December	111.9	111.8	114.0	126.5	129.4	16,262	31,015	36,628	7,068	358	4,175	1,063	95	46,710	65,569
1930: December	97.9	97.8	94.7	123.9	124.2	17,770	24,024	34,332	6,200	336	3,055	1,439	74	25,324	35,512
1931:															
January	96.6	96.2	90.4	128.8	107.7	11,869	24,056	24,488	4,757	326	3,092	1,570	343	41,663	45,890
February	94.5	95.6	92.9	130.7	103.2	8,859	28,751	32,332	5,634	249	2,898	1,409	640	33,822	68,421
March	89.8	93.3	89.8	132.0	96.5	11,929	25,414	33,544	5,740	226	3,256	1,506	1,352	60,394	120,164
April	91.7	96.7	92.0	129.0	91.5	11,162	27,647	35,585	6,344	195	3,146	964	1,132	30,206	67,008
May	93.0	91.4	88.4	129.3	88.4	13,120	26,960	33,593	5,996	162	3,126	1,044	195	17,706	34,006
June	89.6	86.7	84.1	124.1	87.9	13,111	25,981	34,747	5,675	146	2,715	1,024	74	14,650	29,711
July	89.4	86.2	82.9	119.2	86.7	11,975	25,068	28,495	4,370	143	2,569	997	25	67,958	18,809
August	86.6	84.4	80.4	117.4	85.3	12,363	24,548	17,074	2,607	162	2,443	1,238	40	65,043	35,367
September	85.7	86.0	80.8	120.4	99.5	12,952	26,598	25,058	3,797	142	2,310	1,252	91	66,440	48,590
October	85.4	85.7	80.8	127.0	120.7	16,037	25,282	26,102	3,922	141	2,389	1,180	94	50,071	33,968
November	83.1	83.5	76.4	131.9	133.9	14,084	24,509	21,440	3,547	143	2,276	1,126	66	12,872	29,871
December	**81.9**	**82.0**	**75.0**	**132.3**	**119.3**			**23,242**	**3,733**		**2,234**	**1,172**		**11,998**	**17,029**
Monthly average, January through December:															
1929		112.3	113.4	121.4	108.7	17,222	30,543	37,461	6,955	305	4,451	927	460	64,826	77,538
1930		104.5	103.9	128.8	110.0	13,931	31,847	39,507	7,029	333	3,766	1,074	458	69,473	47,383
1931		**89.0**	**84.5**	**126.8**	**101.7**			**27,975**	**4,677**		**2,705**	**1,207**		**39,402**	**45,736**

*Current Survey of Business.

The Financial Markets

Stock Market Values Rise—Chemical Markets Average Price Advances—Dividend Changes of Prominent Chemical Stocks—Reorganization Plan American Solvents Announced

The stock market turned bullish in February. A year ago in the same month the market showed similar tendencies and it remains to be seen whether the advances can be consolidated and pushed further. The new Reconstruction Finance



—*N. Y. Herald Tribune*

Corporation began to function and this together with better sentiment on foreign conditions and the enactment of the Glass-Steagall Bill aided in the substantial recovery.

Stocks Rise

The market rebounded from the low point reached as the month of January ended and showed improvement for three weeks. A major part of the month's rise was accomplished on Feb. 15. Some reaction was expected and the last few days witnessed the loss of approximately half of the increases made.

Twenty of the most important groups, comprising 240 stocks, listed on the N. Y. Stock Exchange as reported in the *N. Y. Times*, showed an appreciation of $799,351,750 in February, or 7½ per cent from the values obtaining at the end of the previous month, following a loss of $257,297,187 in January, equivalent to 2 per cent, and compared with a gain of $2,720,313,453, or 10 per cent in February, 1931.

Chemical Group

The chemical group followed the general trend of the market closely reaching a high point in the week ending Feb. 20 and then declining moderately. A glance at the accompanying price trend of leading chemical and allied industries common stocks shows that only one, Anaconda Copper, failed to register some improvement. This is easily explained with the apparent failure of the international copper producers to reach any agreement and with the consequent rapid decline in the price of the metal.

Group Changes

Group changes in values for February, compared with a year ago, follow:

		1932		*1931*
Amusements	+	$5,632,015	+	$34,602,923
Bldg. equip't	+	6,192,206	+	46,211,479
Bus. equip't	+	3,971,868	+	35,319,752
Chain stores	+	13,224,324	+	87,702,453
Chemicals	+	94,331,142	+	281,680,208
Coppers	—	67,975,078	+	243,940,495
Dept. stores	+	732,720	+	31,967,373
Foods	+	92,566,997	+	128,304,253
Leathers	+	28,185	+	830,528
Mail order	+	8,319,302	+	76,947,731
Motors	—	220,719	+	320,180,576
Motor equip't	+	6,458,230	+	22,072,039
Oils	+	134,970,132	+	169,347,831
Public Utility	+	426,169,894	+	887,244,169
Railroads	—	43,081,811	+	81,680,457
Railroad equip't	+	7,123,702	+	18,137,672
Rubber	+	2,291,728	+	22,583,141
Steels	+	98,756,050	+	170,239,975
Sugars	—	858,643	+	5,833,243
Tobaccos	+	10,719,506	+	55,487,155
Total	+	$799,351,750	+	$2,720,313,453

Average Price

CHEMICAL MARKETS' Average Price for 15 representative industrial chemical common stocks showed an advance of 2.76 points during February. On Friday, Jan. 29 the Price stood at 25.95 and on Feb. 26, 28.71. The high point was reached in the third week of the month when the Price reached 29.85. On Feb. 28, 1931 the figure was 62.3. Stocks included in the Price are Air Reduction, Allied, Davidson Chemical, Anaconda, Columbian Carbon, Commercial Solvents, Corn Products, Devoe & Reynolds, du Pont, Liquid Carbonic, Standard of N. J., U. S. I., Texas Gulf Sulphur, Union Carbide, and Cyanamid.

The dollar increase in values of several leading chemical stocks showed considerable appreciation, specially allied, du Pont and Carbide.

	Increase
Allied Chemical & Dye	$22,512,075
Commercial Solvents Corp	3,479,008
Davison Chemical Co	126,017
Du Pont de Nemours & Co	38,729,838
Mathieson Alkali Works	1,382,176
Texas Gulf Sulphur	3,493,050
Union Carbide & Carbon	23,053,505
U. S. Industrial Alcohol	1,495,376
Virginia-Carolina Chemical	60,097
Total	$94,331,142

The same list of companies lost $76,262,096 during January. The market to date has therefore improved slightly since the advent of the new year.

Dividend Changes

The record of dividend changes in February shows 128 dividend omissions compared with 192 in January and 99 in February last year. Dividends on 96 stocks were reduced in February against 114 in the preceding month and 66 last year. There were no dividend increases for the month compared with nine in January and 15 a year ago. Initial payments were declared on eight issues against 12 in January and 12 in February last year. Payment was resumed on nine stocks against 12 in January and six in February. Twenty-one extras were announced compared with 62 in January.

Among the prominent chemical allied industry companies omitting the dividend in February were: International Nickel, Kennecott, Nevada Copper, Utah Copper, Virginia Carolina Chemical preferred.

Dividend reductions included Atlas Powder, Commercial Solvents, General Asphalt, Harbison Walker, International Cement, International Salt, Standard Oil of California, Texas Corp., Texas Gulf Sulphur, Wesson Oil and Union Carbide.

Carbide Dividend

Union Carbide directors declared quarterly dividend of 50c a common share, payable April 1 to stock of record of March 4. Stock was previously on a $2.60 annual basis.

Price Trend of Chemical Company Stocks

Name	*Jan. 29*	*Feb. 6*	*Feb. 13*	*Feb. 20*	*Feb. 27*	*Net Change*
Allied Chem	67	66	69¼	80¼	76	+ 9
Air Reduction	47¾	48	48	56⅝	55	+10¼
Anaconda	10¼	9⅜	9⅝	10⅜	9⅜	— ⅞
Col. Carbon	32¾	30½	32½	36¾	33⅞	+ 1⅛
Com. Sol	7½	7⅞	8⅛	9⅛	8⅝	+ 1⅛
Du Pont	49¾	49	52⅛	58	54⅜	+ 4⅝
Mathieson	14⅞	14⅜	15½	18	15¾	+ ⅞
Monsanto	22	23	22	24	24⅜	+ 2⅜
Stnndard N. J.	25½	26⅜	27⅞	29⅛	28¼	+ 2¾
Texas Gulf	23¼	23	23⅝	24¾	24½	+ 1¼
U. S. I.	23¼	22¼	24	27⅜	27¾	+ 4½

Reorganization Plan

A plan for the reorganization of American Solvents & Chemical has been announced by a reorganization committee of which J. P. Ripley, vice-president of National City, is chairman. Reorganization committee consists principally of members of the debenture holders' and stockholders' protective committees which also have approved the plan. The securities affected by the plan are the American Solvents, General Industrial and Rossville debentures and the preference and common stock of American Solvents & Chemical Corp.

Sale of Plants

Plan provides for the organization of a new company to acquire such of the properties as the reorganization committee shall determine. Approximately $1,650,000 in cash is to be provided through the sale of certain idle plants and an additional $731,500 of new money will be introduced through the offering to present security holders of 133,000 shares of common stock of the new company. As a result, the pro forma balance sheet of the new company indicates that it will be in a strong working capital position.

Holders of the three present issues of debentures are to receive in the aggregate $3,990,000 par value of 7 per cent convertible preferred stock and 66,500 shares of common stock, representing all the securities which are to be distributed to holders of existing securities. In addition, these debenture holders are to receive the first right to subscribe to the 133,000 shares of common stock which are to be offered for subscription. To the extent that the debenture holders do not so subscribe, the subscription rights will accrue to the present preference and common stockholders. An underwriting of the subscription rights has been provided at the same price at which such rights are offered to security holders under the plan, the compensation being warrants entitling the holders to purchase 30,000 shares of common stock at the same price over the next two years. Total capitalization of the new company is to be the $3,990,000 par value of preferred stock and 207,412 shares of common stock. New company will have no funded debt.

Terms

Under the plan, each $1,000 debenture will receive $600 par value of the new preferred stock and ten shares of the new alent to 60 per cent of the accrued interest common stock, plus a cash payment equivon the debentures through Dec. 31, 1931. Subscription rights give to holders of each $1,000 debenture right to subscribe for 20 shares of new common stock at $5.50 a share. Rights to the present preference and common stockholders are also at $5.50 a share but apply only to such shares as are not subscribed by the debenture holders. If the plan is carried out promptly, it is estimated by those close to the management that the net income for 1932 of the properties which are to be acquired under the plan, should approximate $750,000. This is equivalent to about 2.7 times the annual dividend requirements on preferred stock, and after preferred dividends is equivalent to about $2.27 a share on the new common stock.

The reorganization committee consists of Joseph P. Ripley, chairman; C. O. Cornell, Milton C. Cross, Frederico Lage, Arthur W. Loasby, John Nickerson, H. I. Peffer, Davenport Pogue, I. J. Seskis and Leslie L. Vivian. Nelson Stuart, 22 William St., is secretary. City Bank Farmers Trust Co. is depositary.

Dividends and Dates

Name	Div.	When Payable	Books Close
Abbott Laboratories	.62½	Apr. 1	Mar. 18
Amer. Smelt & Ref. pf	$1.75	Mar. 1	Feb. 5
Amer. Smelt & Ref. 2" pf	$1.50	Mar. 1	Feb. 5
Archer-Daniels-Midland com	.25	Mar. 1	Feb. 19
Atlas Powder com	.50	Mar. 10	Feb. 29
Carman & Co., Cl A	.50	Mar. 1	Feb. 15
Colgate-Palmolive-Peet, pf	$1.50	Apr. 1	Mar. 10
Drug Inc	$1.00	Mar. 1	Feb. 15
Du Pont, com	$1.00	Mar. 15	Feb. 26
Du Pont	$1.50	Apr. 25	Apr. 9
Eastman Kodak, com	$1.25	Apr. 1	Mar. 5
Eastman Kodak, pf	$1.50	Apr. 1	Mar. 5
Intern'l Salt, com	.50	Apr. 1	Mar. 15
Mathieson Alkali Works, com	.50	Apr. 1	Mar. 14
Mathieson Alkali Works, pf	$1.75	Apr. 1	Mar. 14
Monroe Chem. pf	.87½	Apr. 1	Mar. 12
Nat'l Lead, com	$1.25	Mar. 31	Mar. 18
Nat'l Lead, pf B	$1.50	May 2	Apr. 22
Penick & Ford Ltd	.25	Mar. 14	Feb. 29
Proctor & Gamble 5% pf	$1.25	Mar. 15	Feb. 25
St. Joseph Lead	.15	Mar. 21	Mar. 10
Socony-Vacuum Corp	.25	Mar. 15	Feb. 19
Stan. Oil of Calif	.50	Mar. 15	Feb. 15
Stan. Oil of N. J.	.25	Mar. 15	Feb. 15
Stan. Oil of N. J.	.25	Mar. 15	Feb. 15
Texas Gulf Sulfur	.50	Mar. 15	Mar. 1
Vulcan Detinning Co. com	.50	Apr. 20	Apr. 7
Vulcan Detinning pf	$1.75	Apr. 20	Apr. 7
Westvaco Chlorine Prod., com	.40	Mar. 1	Feb. 15

Paraffine Dividend

Paraffine Companies, declared dividend of 50 cents, payable March 27 to stock of record March 17. In the previous quarter company paid dividend of 75 cents, prior to which the stock was on a $4 annual basis.

Eastman Kodak declared regular quarterly dividend of $1.25 on common stock, omitting to declare the usual quarterly extra of 75 cents. Regular quarterly dividend of $1.50 declared on preferred stock.

Annual and Special Meetings

	Record Date	Meeting Date
Barnsdall Corp. (annual & special)	Feb. 23	Mar. 15
Du Pont de Nemours & Co.	Feb. 16	Mar. 14
Eastman Kodak	Mar. 5	Apr. 5
Hercules Powder Co.	Feb. 23	Mar. 15
Int'l Nickel	Mar. 1	Mar. 29
Monsanto Chem Works	Feb. 20	Mar. 22
Westvaco Chlorine Prod.	Feb. 15	Mar. 23

Investment Trusts

Changes in chemical stock holdings of two investment trusts are listed below:

Adams Express

	1931	1930	Inc.	Dec.
Air Reduction	....	3,000	....	3,000
Allied Chemical	1,450	1,050	400	....
Comm'l Solvents	5,000	5,000	....	....
Du Pont	....	2,000	....	2,000
Eastman Kodak	4,500	4,500	....	....
Inter Agric pfd	2,000	2,000	....	....
Mathieson Alkali	20,000	17,600	2,400	....
Natl Distillers	5,000	5,000	....	....
Penick & Ford	6,000	4,000	2,000	....
S. O. of California	5,100	5,100	....	....
S. O. of N. J.	5,000	5,000	....	....
S. O. of N. Y.	....	5,000	....	5,000
Union Carbide and Carbon	12,200	10,000	2,200	....

Standard Investing

	Dec. 1931	June 1930	Inc.	Dec.
Air Reduction	100	1,000	....	900
Colgate-Palmolive Peet	1,500	1,000	500	....
Corn Products Rfg.	....	2,000	....	2,000
Drug, Inc.	2,800	4,000	....	1,200
Du Pont deb stk	400	....	400	....
Intern'l Nickel	....	5,000	....	5,000
New Jersey Zinc	....	1,000	....	1,000

Stockholders

Average increase of 49 per cent in number of recorded common stockholders of 25 leading American corporations between 1929 and 1931 is revealed by survey made by Distributors Group, Inc. Number of stockholders of chemical and allied companies in the group at close of 1931 compared with 1929 follows:

Company	No. of Shareholders 1929	1931	% Inc.
Drug, Inc.	16,200	27,000	66
E. I. duPont	33,971	51,707	52
Eastman Kodak	31,350	36,164	15
Proctor & Gamble	8,097	14,971	84
Standard Oil N. J.	77,604	117,568	51
Union Car. & Car.	28,780	49,369	71

U. S. Industrial Alcohol set up a special contingency reserve fund of $5,000,000 from surplus against which the value of fixed assets may be written down from time to time, according to annual report.

Admitted

New York Curb Exchange admitted to unlisted trading privileges new common stock of American Commercial Alcohol of $20 par value on a when, as and if issued, in exchange for present common stock of par value $10 in accordance with plan announced by the company which provides for reduction in number of common shares to 375,000 from 750,000 and increase in par value to $20 from $10 a share on the basis of one share of new common stock for two shares of old common stock.

National Distillers, in order to complete its holdings of preferred stock of American Medicinal Spirits is giving 153,672 shares of its preferred stock, a listing application of the latter company revealed. Acquisition is to be carried out through the formation of a new company, the Medicinal Holding Corporation, to acquire the 76,386 shares of American Medicinal stock not now owned by National Distillers.

Earnings at a Glance

Company	Annual Dividends	Net Income 1931	Net Income 1930	Common Share Earnings 1931	Common Share Earnings 1930
Air Reduction:					
Dec. 31 quarter	§$3.00	$1,011,290	$1,102,176	h$1.20	h$1.32
Year, Dec. 31	§3.00	3,815,409	5,250,379	h4.54	h6.32
Liquid Carbonic:					
12 mos., Dec. 31	2.00	1,015,655	1,503,006	2.96	4.38
Mathieson Alkali Wks:					
Year, Dec. 31	2.00	1,394,107	2,096,007	1.88	2.96
Monroe Chemical:					
Year, Dec. 31	f	253,552	240,465	1.21	1.09
National Distillers Prod:					
Year, Dec. 31	2.00	‡372,328	‡307,286	....	....
New Jersey Zinc:					
Dec. 31 quarter	2.00	546,751	873,367	.28	.44
Year, Dec. 31	2.00	3,051,589	5,013,403	1.55	2.55
Texas Gulf Sulphur:					
Year, Dec. 31	2.00	8,942,602	13,972,085	3.52	5.50
United Carbon:					
Year, Dec. 31	f	†397,769	704,600	....	1.43
U. S. Gypsum:					
Year, Dec. 31	1.60	3,563,143	5,408,685	h2.48	h4.01
U. S. Indus. Alcohol:					
Year, Dec. 31	f	†1,833,828	†1,895,247	....	....
Young Co., J. S.:					
Year, Dec. 31	10.00	229,940	255,816	10.66	12.38
Wood Chem. Products Co.:					
Year, Dec. 31	f	†50,618	†101,375	....	....

†Net loss. fNo common dividend. hOn shares outstanding at close of respective periods. §Plus extras. ‡Profit before Federal taxes.

Company Reports

United Carbon Reports Net Loss

United Carbon and subsidiaries report for year ended Dec. 31, 1931, net loss of $397,769 after depreciation, depletion, etc., and after provision of $296,962, to reduce black carbon inventories to the lower of cost or market. This compares with net profit in 1930 of $704,600, equivalent after dividends paid on 7% participating preferred stock, to $1.43 a share on 397,885 no-par shares of common stock then outstanding.

Current assets as of Dec. 31, 1931, including $572,219 cash, were $3,482,991, and current liabilities $1,016,448, comparing with cash of $633,918, current assets of $4,014,315 and current liabilities of $1,566,826 on Dec. 31, 1930.

Land, buildings, wells, pipe lines, leaseholds and other permanent assets, less depreciation, were carried at $9,868,309. Included in this total are gas properties stated at a net value of $3,951,290, which were appraised as of January, 1931, at approximately $16,000,000. Twenty-nine wells, all productive, were drilled subsequent to the appraisal. Some additional leaseholds were acquired during the year, including about 6,000 acres in Potter County, Pa.

Oscar Nelson, president, United Carbon in letter to stockholders, said in part:

"Deliveries of natural gas have not yet equaled expectations, but they are, nevertheless, showing a steady increase. Shipments of carbon black during the year increased 18% over those of 1930."

Consolidated income account of United Carbon, and subsidiaries for year ended Dec. 31, 1931, compares as follows:

	1931	1929	1930
Net sales	$3,229,867	$3,541,140	$4,321,732
†Costs, expenses, etc.	3,089,686	2,652,783	3,148,278
Operating profit	$140,181	$888,357	‡1,173,454
Other income	*73,705	*475,703	*477,888
Total income	$213,886	$1,364,060	$1,651,342
Price adj. carbon black inventory	296,962	292,789	.....
Interest and discount	52,292	25,408	137,198
Surr. leases, etc.	82,922	110,661	78,359
Other deductions	179,479	230,602	121,230
Net loss	$397,769	‡$704,600	‡$1,314,555
Preferred dividends	.....	136,011	282,435
Common dividends	.....	687,911	196,536
Deficit	$397,769	$119,322	§$835,584

*Includes $37,968 profit from sale of properties in 1931, $338,906 in 1930 and $344,429 in 1929. †Includes depreciation, depletion and taxes. ‡Net profit. §Surplus.

Air Reduction Earns $4.54 a Share

Air Reduction for year ended Dec. 31, 1931, shows consolidated net profit of $3,815,409 after federal taxes, depreciation, etc., equivalent to $4.54 a share on 841,288 no-par shares of capital stock. This compares with $5,250,379 or $6.32 a share on 830,435 shares in 1930.

For quarter ended Dec. 31, 1931, consolidated net profit was $1,011,290 after charges and federal taxes, equal to $1.20 a share on 841,288 shares comparing with $758,627 or 90 cents a share on 841,288 shares in preceding quarter and $1,102,176 or $1.32 a share on 830,435 shares in fourth quarter of 1930.

Current assets of Air Reduction as of Dec. 31, 1931, including $5,601,703 cash, amounted to $19,088,372 and current liabilities $1,628,645, comparing with cash of $6,475,772, current assets of $18,500,596 and current liabilities of $1,085,661 at close of previous year.

Consolidated income account for year 1931 compares as follows:

	1931	1930	1929	1928
Gross inc.	$15,641,352	$19,515,133	$21,801,993	$15,652,009
Oper exp.	10,114,563	12,330,024	13,105,608	9,752,924
Oper inc.	$5,526,789	$7,185,109	$8,696,385	$5,899,085
Other inc.	734,754	931,315	.....	.....
Total inc.	$6,261,543	$8,116,424	$8,696,385	$5,899,085
*Spl deduct, etc.	.....	.....	.....	198,323
Depr res, etc.	2,003,162	2,211,479	2,159,506	1,992,023
Federal tax	442,972	654,566	563,884	499,746
Net profit	$3,815,409	$5,250,379	$5,972,995	$3,208,993
Dividends	3,785,782	3,661,897	3,228,059	2,050,398
Surplus	$29,627	$1,588,482	$2,744,936	$1,158,595

*Additional compensation to officers and employes.

Quarter ended December 31:

	1931	1930	1929	1928
Gross inc.	$3,773,525	$4,739,788	$5,819,923	$4,584,586
Oper exp.	2,211,813	2,836,928	3,444,305	2,675,962
Oper inc.	$1,561,712	$1,902,860	$2,375,618	$1,908,624
Depr, etc.	451,313	609,604	715,309	529 728
Federal taxes	99,109	191,080	†19,730	149,684
Net profit	$1,011,290	$1,102,176	$1,680,039	$1,229,212

†Credit.

U. S. I. Net Loss $1,833,828

U. S. Industrial Alcohol and subsidiaries for year ended Dec. 31, 1931, shows net loss $1,833,828 after expenses and depreciation. Only minor adjustments in inventories were necessary during 1931 and these were charged direct to operating expenses. For year ended Dec. 31, 1930, profit after expenses and depreciation was $1,104,753 before inventory adjustments, and net loss after inventory adjustment of $3,000,000, was $1,895,247.

Current assets as of Dec. 31, 1931, were $9,384,399 and current liabilities $659,841, comparing with $13,506,903 and $2,638,355, respectively, on Dec. 31, 1930. Cash amounted to $2,327,478 against $4,165,680 at end of preceding year.

Consolidated income account for year 1931, compares as follows:

	1931	1930	1929	1928
‡Oper inc.	$1,049,703	$4,073,365	$8,942,594	$7,196,712
Expenses	1,726,582	1,804,469	2,392,746	1,910,763
Depreciation	1,156,949	1,164,143	1,245,424	1,038,042
Loss	$1,833,828	*$1,104,753	*$5,304,424	*$4,247,907
Fed taxes	.....	.....	583,566	470,106
Inv. adj.	.....	3,000,000	.....	.....
Net loss	$1,833,828	$1,895,247	*$4,720,858	*$3,777,801
Cuba dis divs.	.....	.....	.....	74,635
Pfd divs.	.....	.....	.....	407,982
Com div.	186,922	2,243,064	2,454,768	1,380,000
Deficit	$2,020,750	$4,138,311	†$2,266,090	†$1,915,184
P & L surp.	2,789,765	10,855,186	15,238,355	14,214,214

*Profit. †Surplus. ‡Includes other income.

Solvay American Profits Cut in Half

Solvay American Investment reports profit of $330,138 for the quarter ended Dec. 31, 1931, after interest, taxes, loss of $305,924 on securities sales, and other charges, but before Federal taxes. This compared with a profit of $659,765, including a profit of $2,563 on sale of securities, in the final quarter of 1930, after interest, taxes and other charges, but before Federal tax.

Mathieson Reports $1,394,107 Income

Mathieson Alkali reports for year ended Dec. 31, 1931, net income of $1,394,107 after depreciation, depletion and federal taxes, equivalent after dividend requirements on 7% preferred stock, to $1.88 a share on 650,436 no-par shares of common stock. This compares with $2,096,007 or $2.96 a common share in 1930.

Current assets as of Dec. 31, last, including $606,834 cash, amounted to $2,705,573 and current liabilities were $759,438. This compares with cash of $1,120,741, current assets of $3,284,172 and current liabilities of $1,088,147 at close of preceding year.

Income account for year 1931 compares as follows:

	1931	*1930*	*1929*	*1928*
Earn aft surp	$2,603,392	$3,484,409	$3,580,930	$3,319,248
Depr and depl	1,146,442	1,204,209	1,026,721	912,752
Net fr oper	$1,456,950	$2,280,200	$2,554,209	$2,406,496
Inc cred (net)	53,676	53,198	57,905	*29,614
Total inc	$1,510,626	$2,333,398	$2,612,114	$2,376,882
Fed tax	116,519	237,391	287,838	285,480
Net inc	$1,394,107	$2,096,007	$2,324,276	$2,091,402
Pfd divs	173,005	173,250	173,250	173,250
Com divs	1,300,802	1,300,762	1,135,018	882,717
Deficit	$79,700	†$621,995	†$1,016,008	†$1,035,435

*Debits. †Surplus.

National Distillers Lowers Deficit

National Distillers Products and subsidiaries for year ended Dec. 31, 1931, shows net profit of $372,328 after interest, depreciation, etc., but before federal taxes, comparing with $307,286 in 1930. Capital stock consists of 275,861 no-par shares.

No provision for federal taxes was made for years 1931 and 1930, as it was believed the excess provisions made in previous years and included in the reserve for contingencies in the balance sheet were sufficient for any liability for federal taxes at Dec. 31, 1930.

Current assets as of Dec. 31, 1931, including $683,325 cash, amounted to $14,697,282, and current liabilities $1,930,839. This compares with cash of $817,953, current assets of $15,181,233, and current liabilities of $2,165,040 at close of previous year.

Consolidated income account for year 1931 compares as follows:

	1931	*1930*	*1929*	*1928*
Net sales	$4,711,114	$4,214,826	$2,062,786	$6,414,399
Costs	2,588,830	2,172,546	1,634,474	5,292,230
Balance	$2,122,284	$2,042,280	$428,312	$1,122,169
Other income	140,989	167,034	294,188	322,371
Total income	$2,263,273	$2,209,314	$722,500	$1,444,540
Expenses	1,268,729	1,335,355	585,271	895,703
Balance	$994,544	$873,959	$137,229	$548,837
Sub prof	†458,917	†392,502	675,695	427,566
Int, depr., etc	163,299	174,171	203,805	391,298
‡Profit	$372,328	$307,286	$609,389	$585,105
Pfd divs	.....	.....	251,772	.....
Com divs	507,344	*636,155	.....	.....
Deficit	$135,016	$328,869	.....	.....

*Includes dividends payable February 2, 1931. †proportion of profit of American Medicinal Spirits Co., applicable to preferred stock of that company held by public. ‡Before federal tax.

Monroe Earnings Higher in 1931

Monroe Chemical reports for year ended Dec. 31, 1931, net profit of $253,552, after depreciation, interest and federal taxes, equivalent, after allowing for dividend requirements on the $3.50 preference stock, to $1.21 a share on 126,000 no-par shares of common stock. This compares with $240,465, or $1.09 a common share, in 1930.

Current assets at end of 1931 were $464,706 and current liabilities $77,299, comparing with $430,598 and $175,096, respectively, on Dec. 31, 1930.

Wood Chemical Products reports for year ended Dec. 31, 1931, net loss of $50,618 after charges, depreciation, etc., comparing with net loss of $101,375 in 1930.

Current assets as of Dec. 31, last, amounted to $187,241 and current liabilities $134,465 comparing with $221,108 and $91,945, respectively, at close of preceding year.

Texas Gulf Nets $3.52 a Share

Texas Gulf Sulphur for year ended Dec. 31, 1931, shows net income of $8,942,602 after costs, expenses, federal taxes, etc., equivalent to $3.52 a share on 2,540,000 no-par shares of stock. This compares with $13,972,085 or $5.50 a share in 1930.

Current assets as of Dec. 31, 1931, were $19,548,500 and current liabilities, excluding federal taxes reserve, $1,532,207, comparing with $19,447,550 and $1,214,198, respectively, on December 31, 1930. Cash amounted to $3,477,002, against $5,488,051 at end of previous year.

Income account for year 1931 compares as follows:

	1931	*1930*	*1929*	*1928*
Gross inc	$18,213,806	$25,815,550	$29,883,243	$26,083,612
Exp. fed tax, etc	9,271,204	11,843,465	13,635,765	11,565,993
Net inc	$8,942,602	$13,972,085	$16,247,478	$14,517,619
Dividends	8,255,000	10,160,000	10,160,000	10,160,000
Surplus	$687,602	$3,812,085	$6,087,478	$4,357,619
Prev. surp	25,200,645	21,388,560	15,301,082	10,943,463
*P&L surp	$25,888,247	$25,200,645	$21,388,560	$15,301,082

*Includes depletion reserve.

Abbott Laboratories reports for year ended Dec. 31, 1931, net profit, excluding profit of Canadian subsidiary, of $408,461 after depreciation and federal taxes, equivalent to $2.81 a share on 145,000 no-par shares of stock. This compares with $482,064 or $3.32 a share in 1930.

Current assets as of Dec. 31, 1931, excluding sundry receivables and cash deposits totaling $93,000 in closed banks, amounted to $2,364,341 and current liabilities were $499,818.

Consolidated Chemical Industries reports net profit for year ended Dec. 31, 1931, before deducting depreciation and income taxes, amounted to $716,473.10, with a final net profit of $430,289.70, equivalent to $2.10 a share on 205,000 shares of Class "A" stock as compared with $925,189.19, before deducting depreciation and income taxes, and a final net profit of $628,694.17 for the year 1930.

Condensed Profit and Loss Account

Calendar Year 1931

Net Profit, before deducting reserves for depreciation and reserves for income taxes	$716,473.10
Depreciations charged off	227,874.56
Net Profit, before deducting reserves for income taxes	$488,598.54
Income Taxes	58,308.84
Final Net Profit	$430,289.70

Liquid Carbonic reports for 12 months ended Dec. 31, 1931, net profit of $1,015,655 after interest, depreciation and federal taxes, equal to $2.96 a share on 342,406 no-par shares of capital stock. This compares with $1,503,006 or $4.38 a share in the corresponding 12 months of 1930. Net sales in 12 months ended Dec. 31, last, totaled $9,384,105 against $12,949,880 in like 1930 period. Company's fiscal year ends on September 30.

Consolidated income account of the Liquid Carbonic for 12 months ended Dec. 31, 1931, compares as follows:

	1931	*1930*
Net sales	$9,384,105	$12,949,880
Profit after expenses, etc	1,789,603	2,405,528
Interest charges	38,662	77,609
Depreciation	619,121	606,601
Income taxes	116,165	218,312
Net profit	$1,015,655	$1,503,006

British Cyanides Company, Ltd. reports net profit for the year ended June 30 amounted to £2,927 (against £3,684 for 1929-30), to which must be added £529 brought forward. Dividend for the year to December 31, 1930, on the preference shares, together with Rock Investment Company's percentage absorbs £1,511, leaving a balance £of 1,945, which it is proposed to carry forward.

Freeport Reports Profit of $2,376,782

Freeport Texas for year ended Dec. 31, 1931, shows net income of $2,376,782 after expenses, depreciation, federal taxes, etc., equivalent to $3.26 a share on 729,844 no-par shares of stock. This compares with net income in year ended Dec. 31, 1930, of $3,124,185 or $4.28 a share.

Current assets amounted to $9,618,546 as of Dec. 31, 1931, comparing with $10,137,840 at end of Dec. 1930, and current liabilities were $3,618,149 against $4,667,728. At close of 1931 cash amounted to $2,154,029 compared with $3,431,763 at end of previous year.

Consolidated income account for year ended December 31, 1931, compares as follows:

	Year end, Dec. 31, 1931	*Year end, Dec. 31, 1930*	*Year end, Nov. 30, 1929*	*Year end, Nov. 30, 1928*
Gross sales	$10,192,150	$13,906,178	$14,778,331	$13,173,860
Costs & exp	7,234,952	10,161,087	10,022,940	9,456,566
Oper profit	$2,957,198	$3,745,091	$4,755,391	$3,717,294
Other inc	41,998	162,202	135,164	118,761
Total inc	$2,999,196	$3,907,293	$4,890,555	$3,836,055
Tax reserve	258,561	332,384	611,637	369,471
Deprec res	307,466	361,853	193,877	191,008
Other chgs	56,387	88,871	.....	.....
Net income	$2,376,782	$3,124,185	$4,085,041	$3,275,576
Dividends	1,642,149	2,919,376	2,919,376	4,743,986
Surplus	$734,633	$204,809	$1,165,665	*$1,468,410

*Deficit.

United States Gypsum reports for year ended Dec. 31, 1931, net income of $3,563,143 after depreciation, depletion, federal taxes, etc., equivalent after 7% preferred dividends to $2.48 a share (par $20) on 1,217,472 shares of common stock outstanding at end of year. This compares with $5,408,685 or $4.01 a share on 1,212,598 common shares in 1930.

Consolidated income account for year 1931 compares as follows:

	1931	*1930*	*1929*	*1928*
Earns aft exp	$5,789,927	$7,835,520	$7,415,620	$8,325,322
Other income	717,212	683,133	.....	.....
Total inc	$6,507,139	$8,518,653	$7,415,620	$8,325,322
Depr & depl	2,256,402	2,163,031	1,766,083	1,517,082
Fed taxes	343,899	687,074	547,232	776,605
Other deduct	343,695	259,863	.....	.....
Net income	$3,563,143	$5,408,685	$5,102,305	$6,031,635
Pfd divs	548,753	543,669	528,090	541,503
Com divs	1,906,132	2,469,985	1,376,025	1,161,698
Surplus	$1,108,258	$2,395,031	$3,198,190	$4,328,434

Atlas 1931 Earnings Decline Severely

Atlas Powder for year ended Dec. 31, 1931, shows net income of $746,454 after depreciation and federal taxes, equivalent after 6% preferred dividends, to 59 cents a share on 261,438 no-par shares of common stock. This compares with $1,246,432 or $2.67 a common share in 1930.

Consolidated balance sheet as of Dec. 31, 1931, shows total assets of $32,082,116, compared with $33,831,713 on Dec. 31, 1930, and surplus $4,564,487, against $8,355,520. Current assets, including $5,086,468 cash U. S. Government and other marketable securities at cost, aggregated $10,432,275 and current liabilities were $476,546, as compared with current assets of $11,466,643 and current liabilities of $787,990 at end of 1930. U. S. Government securities and other marketable securities, at cost, showed depreciation in market value Dec. 31, 1931, of $227,898. The investment in Atlas Powder preferred and common stock is carried at cost, which is substantially less than the book value.

To provide against future obsolescence of manufacturing facilities, shrinkage, in value of current assets and contingencies, there was transferred from surplus to reserves during the year the sum of $2,900,000.

Consolidated statement for year 1931 compares as follows:

	1931	*1930*	*1929*	*1928*
Net sales	$12,093,890	$16,468,361	$22,011,930	$21,248,993
*Net income	746,454	1,246,432	2,542,692	†2,186,783
Pfd divs	591,746	549,402	540,000	540,000
Sur for com	$154,708	$697,030	$2,002,692	$1,646,783

*After depreciation, federal taxes, etc. †Excludes income from sale of stock of affiliated company.

Hachmeister-Lind in a preliminary report for year ended Dec. 31, 1931, shows net income of $244,686 after depreciation, taxes, etc., equivalent after deducting $123,514 preference dividends, to $1.38 a share on 87,614 no-par shares of common stock. This compares with net income in 1930, including Pruett-Schaffer Chemical Co. for full year, of $133,247, equal after annual dividend requirements on $6 preference stock, to three cents a share on 74,400 common shares. Including Pruett-Schaffer Chemical Co. from July 1, 1930, date of merger, to Dec. 31, 1930, the 1930 net income was $103,126, equal to $4.73 a share on 21,800 no-par shares of $6 preference stock, series A.

St. Joseph Lead and subsidiaries for year ended Dec. 31, 1931, shows profit of $477,237 after interest, depreciation, and minority interest, but before depletion, equivalent to 24 cents a share (par $10) on 1,950,465 shares of stock. This compares with profit before depletion in 1930 of $4,076,460, equal to $2.09 a share.

Annual Reports Show that——

Tabulation shows number of times interest charges and preferred dividend requirements have been earned in 1931 by together with important balance sheet items, as abstracted from annual reports:

	Interest times earned	*Pfd. div. times earned*	*Cash and mark securities*	*Inventories*	*Ratio cur. assets to cur. liabil.*	*Working capital*
Air Reduction Co.:						
Year, Dec. 31, 1931	No fd. dbt.	f1.00	b$15,103,700	$1,661,951	11.7	$17,459,727
Year, Dec. 31, 1930	No fd. dbt.	f1.43	b13,717,384	1,877,186	10.6	16,760,689
Commercial Solvents Corp.:						
Year, Dec. 31, 1931	No fd. dbt.	No pfd.	b4,804,303	1,418,476	17.8	6,318,439
Year, Dec. 31, 1930	No fd. dbt.	No pfd.	†4,838,218	2,549,045	10.4	7'636,203
Mathieson Alkali Works:						
Year, Dec. 31, 1931	No fd. dbt.	8.06	†606,834	1,465,079	3.5	1,945,835
Year, Dec. 31, 1930	No fd. dbt.	12.10	†1,120,741	1,461,959	3.0	2,196,025
Texas Gulf Sulphur:						
Year, Dec. 31, 1931	No fd. dbt.	No pfd.	†3,477,002	14,192,158	12.7	18,016,293
Year, Dec. 31, 1930	No fd. dbt.	No pfd.	†5,488,051	11,928,750	15.8	18,233,352
United Carbon Co.:						
Year, Dec. 31, 1931	No fd. dbt.	*...	†572,219	1,933,377	3.4	2,466,503
Year, Dec. 31, 1930	No fd. dbt.	5.18	†633,918	2,481,412	2.5	2,447,490
U. S. Gypsum Co.:						
Year, Dec. 31, 1931	No fd. dbt.	6.49	b11,168,419	3,736,901	15.4	16,981,147
Year, Dec. 31, 1930	No fd. dbt.	9.95	b9,267,934	4,313,515	9.7	15,463,406
U. S. Industrial Alcohol:						
Year, Dec. 31, 1931	No fd. dbt.	No pfd.	†2,327,478	4,249,783	14.2	8,724,557
Year, Dec. 31, 1930	No fd. dbt.	No pfd.	†4,165,680	6,092,475	5.1	10,868,548

fCommon dividends times earned—no preferred stock. bSecurities carried at cost. †Cash only.

The Industry's Stocks

NEW YORK STOCK EXCHANGE

1932 Feb. Last	1932 High	1932 Low	1931 High	1931 Low	1931 High	1931 Low	Sales In Feb.	Sales During 1932	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1931	Earnings $-per share-$ 193
55	59¾	46	59¾	46	109¼	47¼*	60,600	113,100	Air Reduction	No	830,000	$3.00	4.54	6.32
76½	83¼	62¾	83½	62¼	182¾	64*	322,400	758,300	Allied Chem. & Dye	No	2,401,000	6.00		9.77
117½	117½	115	117½	†108	133¼	100*	1,100	2,900	7% cum. pfd.	100	393,000	7.00		
5½	7	5½	7½	5½	29¾	5¼*	2,300	4,100	Amer. Agric. Chem.	100	333,000		Yr. Je. '30	Nil
8½	9½	6½	9½	6½	14½	5	54,200	73,400	Amer. Com. Alc.	No	389,000			d1.27
47	47½	43½	47¼	41¼			9,035	30,435	American Home Products	No	611,000	.35		
15	17½	12¾	18½	12¾	58½	17½*	64,500	147,200	Amer. Smelt. & Refin.	No	1,830,000	4.00		3.77
75	83	73½	85	73	138½	75*	1,400	2,900	7% cum. pfd.	100	500,000	7.00		
					4½	½*	41,300	53,100	Amer. Solvents & Chem.	No	503,000			d2.86
11¼	12	11	12	9½	18	10¼*	2,300	5,500	Archer Dan. Midland	No	550,000	2.00	Yr. Aug. 30	1.68
							24,900	65,000	Armour & Co.	No	50,000,000			
20	25½	18	25½	17½	54	18*	3,700	5,700	Atlas Powder Co.	No	265,000	4.00	.59	2.67
75	75	72½	79½	72¼*	99¼	77¼*	310	870	6% cum. pfd.	100	96,000	6.00		
3¾	4¾	3	5	3			2,300	14,700	Celanese Corp. of America	No	1,000,000			
3¼	3¾	2⅞	3¾	2½	7¼	2½	1,500	2,300	Certain-Teed Products	No	400,000			d7.61
	15½	11½	15½†	11¼*	25½	8½*	300	400	7% cum. pfd.	100	63,000			
29¾	30½	28¼	30¼	26¼	50¾	24*	5,400	13,000	Colgate-Palmolive-Peet	No	2,000,000	2.50		3.76
33¾	38	28	38¾	28	111¾	32*	57,200	89,400	Columbian Carbon	No	499,000	5.00		5.04
8¾	9⅛	7½	9⅜	7¼	21¾	6¼*	127,700	226,100	Comm. Solvents	No	2,530,000	1.00	.83	1.07
44¼	46	38¾	46	37	86¾	36½	63,300	115,100	Corn Products	25	2,530,000	3.00		4.82
126	128	126	129½	126	152½	116*	430	680	7% cum. pfd.	100	250,000	7.00		
4¼	4¾	3⅜	5½	3½	23	3¼*	8,000	16,600	Davison Chem. Co.	No	504,000		Yr. Je. '30	4.00
13¼	13½	10½	13¼	10¼	19¼	8½*	400	800	Devoe & Raynolds "A"	No	160,000	1.20		2.24
95	95	95	95	95	109	100	10	10	7% cum. 1st pfd.	100	16,000	7.00		
52	57	48½	57	47⅜			94,000	230,800	Drug, Inc.	No	3,501,000	1.00		
54	59¾	46¼	59¾	46¼	107	50¼*	718,800	1,373,900	DuPont de Nemours	20	11,014,000	4.00	4.29	4.52
101	102	99½	101†	99¼	185¾	91½	3,300	8,200	6% cum. deb.	100	978,000	6.00		
78¼	84¾	68½	87¼	68½	185¾	77*	13,600	117,200	Eastman Kodak	No	2,261,000	5.00		8.84
118	119½	116	118†	99	135	103*	120	230	6% cum. pfd.	100	62,000	6.00		
18¾	19½	16½	19½	15¼	43¼	13¼	29,800	68,800	Freeport Texas Co.	No	730,000	4.00	3.26	w4.77
5½	6	5	6	4¼	16½	4¼*	4,000	8,500	Glidden Co.	No	695,000		Yr. Oct. '30	Nil
54	54	50	54†	42	80	40*	20	60	7% cum. prior pref.	100	74,000	7.00	Yr. Oct. '30	Nil
28¼	28¼	25	28¼	25	43½	13½	1,400	2,200	Hercules Powder Co.	No	603,000	3.00	1.04	2.61
93	94½	92	94½†	92	119½	95*	330	780	7% cum. pfd.	100	114,000	7.00		
33¾	36¾	27⅜	36¾	23¼	86	21	41,300	53,500	Industrial Rayon	No	200,000	4.00		7.74
1	1		1⅛		5½	1*	2,800	3,600	Intern. Agric.	No	450,000		Yr. Je. '30	1.68
5	5¼	5	7¼	4¾	51¼	4½*	800	2,400	7% cum. prior pfd.	100	100,000	7.00	Yr. Je. '30	14.58
1⅜	1⅜	1	1⅞				29,200	49,700	Intern. Combustion	No	1,049,513			
7¼	8¾	7¾	9¼	7¼	20⅛	7	192,800	416,800	Intern. Nickel	No	14,584,000	1.00		.67
20½	23½	19½	23¼	19½	42	18	6,500	11,700	Intern. Salt	No	240,000	3.00		
9¼	9¼	9½	10	9¼	16½	9	500	1,100	Kellogg (Spencer)	No	598,000	0.80		h1.14
7¼	8¾	6¼	9¼	4½			641,100	1,117,900	Kreuger & Toll					
45	52½	42⅜	56½	42⅜			53,000	105,170	Lambert	No	748,996	8.00		
19¼	22½	19¼	23	19⅜			6,400	18,200	Lehn & Fink	No	419,166	3.00		
18	19½	15½	19¼	14½	55¼	13½*	6,400	13,100	Liquid Carbonic Corp.	No	342,000	4.00	2.96	5.22
4⅜	5½	4	5½	3⅜	17	3⅜	9,900	17,500	McKesson & Robbins	No	1,073,000	1.00		.96
22	23	22	23	22	37⅜	16*	600	780	conv. 7% cum. pref.	50	428,180	3.50		
14¼	15¼	14¼	15¼	13¼	25	13*	200	600	MacAndrews & Forbes	No	340,000	2.60		2.61
17	18¼	14⅜	18¼	13¼	31½	12*	5,800	12,800	Mathieson Alkali	No	650,000	2.00	1.88	2.96
100¼	100½	100½	118	100¼	125⅜	106½*	100	640	7% cum. pfd.	100	28,000	7.00		
23½	25	21⅞	25	20¼	29	16½	11,500	15,900	Monsanto Chem.	No	416,000	1.25		1.71
22⅜	23⅜	18	23¾	17¼	36¾	16*	33,500	40,400	National Dist. Prod.	No	252,000	2.00	—	1.23
90	90	86	92	86	132	78½	1,000	2,000	National Lead	100	310,000	5.00		7.58
120½	121	116	121†	113	143	111*	730	1,270	7% cum. "A" pfd.	100	244,000	7.00		
100	100	100	105	100	120	102*	90	280	6% cum. "B" pfd.	100	103,000	6.00		
28	31½	25	31½	23	46½	22	11,100	20,100	Penick & Ford	No	425,000	1.00		4.01
40	42	38	42¼	37½	71¼	36¾*	26,500	156,600	Procter & Gamble	No	6,410,000	2.40	Yr. Je. '30	3.36
24½	26¾	22½	27	22½	51¼	23¼*	67,900	154,900	Standard Oil, Calif.	No	12,846,000	2.50		2.88
28¼	30¾	28¼	30½	25¾	52½	26*	234,800	513,400	Standard Oil, N. J.	25	25,419,000	1.00		1.65
9¼	10½	8½	10½	8½	26	8¾*	236,500	370,200	Standard Oil, N. Y.*	25	17,809,000	1.60		.92
2	2½	2	2½	1	9½	2*	2,200	7,900	Tenn. Corporation	No	857,000	1.00		1.21
24¾	26¾	22¼	26½	20¼	55½	19¼*	68,400	118,500	Texas Gulf Sulphur	No	2,540,000	4.00	3.52	5.50
32	34½	27½	34½	27½	72	27½*	176,100	430,700	Union Carbide & Carb.	No	9,001,000	2.60		3.12
11¼	12¼	9½	12½	9½	28¾	6½	6,100	10,900	United Carbon Co.	No	398,000		—	1.43
27⅜	28⅜	21⅜	30⅜	21⅜	77⅜	20⅜	123,700	229,600	U. S. Ind. Alc. Co.	No	374,000	6.00	—	z2.96
16½	18¼	12¼	18⅜	11½	76⅜	11*	112,100	165,400	Vanadium Corp. of Amer.	No	378,000	3.00		2.95
					3¼	⅛*	1,300	2,500	Virginia Caro. Chem.	No	487,000		Yr. Je. '30	Nil
3¾	3¾	3⅜	4½	3¼*	17	2⅜*	1,000	1,200	6% cum. part. pfd.	100	213,000		Yr. Je. '30	2.63
24	37	24	39½	24*	72	35*	2,400	3,200	7% cum. prior pfd.	100	145,000	7.00	Yr. Je. '30	11.96
12	12	10⅛	12	9	40	7¼*	1,000	4,100	Westvaco Chlorine Prod.	No		2.00	1.79	2.51

h 11 mos. ending Aug. 30
w 13 mos.
z Before inventory adjustment
* Socony Vacuum

NEW YORK CURB

6	6¼	6	6¼	6	8½	5	700	1,100	Acetol Prod. conv. "A"	No	60,000			
2	2	2	3	2	19½	1¼*	1,900	6,900	Agfa Ansco Corp.	No	300,000			
48¾	58	45	61¾	45	224	48*	25,425	60,575	Aluminum Amer.	No	1,473,000			z1.93
57	63	57	67½	57*	109⅜	56¾*	1,900	4,200	6% cum. pfd.	100	1,473,000	6.00		
3¾	4⅜	3	4⅜	2⅞	12¼	2⅜*	30,400	51,900	Amer. Cyanamid "B"	No	2,404,000			
⅜	½	⅜	½	⅜	15	⅛*	1,100	3,500	Anglo-Chilean Nitrate	No	1,757,000		Yr. Je. '30	Nil
1½	1½	1½	1½†	1	4	½	100	300	Assoc. Rayon Corp.	No	1,200,000		Yr. Je. '30	1.87
					60	32½			conv. 6% cum. pfd.	100	200,000	6.00		

†New High.
*New Low.

1932 Feb. Last	1932 High	1932 Low	1932 High	1932 Low	1931 High	1931 Low	Sales In Feb.	Sales During 1932	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1931	Earnings $-per share-$ 1930
1⅛	1¼	1⅛	1⅛†	1⅛*	2⅜	⅞	3,000	3,400	Brit. Celanese Am. Rcts	2.43	2,806,000			
18	18	18	24½	18*	81¼	16½*	325	1,525	Celanese 7% cum. part. 1st pfd	100	148,000	7.00		
...	30	28	42	22	65	25	350	1,750	" 7% cum. prior pfd	100	115,000	7.00		
2⅜	2½	2⅜	2½	2⅜	...	...	200	450	Celluloid Corp.	No	195,000			
5½	5½	5½	5⅝	5½*	9	5¼*	100	200	Courtaulds, Ltd.	1£				
...	...	...	...	...	51	30¼*			Dow Chemical	No	630,000	2.00		3.44
7½	8½	6½	8½†	6½	13	6½*	700	800	Heyden Chemical Corp.	10	150,000			
...	...	...	...	...	3½	2¾*			Imperial Chem. Ind.	1£			1.21	
...	...	...	...	...	...	...			Monroe Chem.	No	126,000			
...	...	...	...	...	60	20			Shawinigan W. & P.	No	2,178,000	2.50		
...	...	...	...	32½	66½	34¼*		350	Sherwin-Williams Co.	25	636,000	4.00	Yr. Aug. '30	4.14
1	1¼	1	1½	1	12	⅝*	1,800	3,900	Silica Gel Corp.	No	600,000			
15⅜	16⅛	14⅜	16¼	14	38½	13⅜*	88,400	180,800	Standard Oil Ind.	25	16,851,000	2.50		2.73
18½	18⅝	16⅞	18¼	16⅞	30⅜	14⅛*	11,600	30,100	Swift & Co.	25	6,000,000	2.00		2.08
3	3	1⅜	3	1½	16	1½*	8,400	12,300	Tubize "B"	No	600,000	10.00		
									United Chemicals					
13⅞	13⅞	11½	13⅞†	11½*	...	...	600	800	$3 cum. part. pfd.	No	115,000	3.00		
									CLEVELAND					
27	27	27	27	27	...	...	59	59	Cleve-Cliffs Iron, $5 pfd.	No	498,000	5.00		11.42
34½	36	30	36	29½	51½	30*	580	1,500	Dow Chemical Co.	No	630,000	2.00		3.44
32¼	34¼	31¼	35	31¼	68½	33⅛*	2,055	4,055	Sherwin-Williams Co.	25	636,000	4.00	Yr. Aug. '30	4.14
									CHICAGO					
30⅜	30⅜	27	31⅜	27	39⅜	26½*	500	1,050	Abbott Labs.	No	145,000	2.50		3.32
3¼	3¼	3⅛	3¼	3⅛	5½	3	290	290	Monroe Chem.	No	126,000		1.21	1.09
32½	32½	30	32½†	27	33	24	240	590	$3.50 cum. pref.	No	30,000	3.50		
18¼	18¼	16⅞	18⅜	16⅞	30½	16½*	23,100	37,700	Swift & Co.	25	6,000,000	2.00		2.08
									CINCINNATI					
40	42	38	42¼	38	71	36⅛*	5,812	12,312	Procter & Gamble	No	6,410,000	2.40	Yr. Je. '30	3.36
									PHILADELPHIA					
...	...	...	35	35	75	37¼*		100	Pennsylvania Salt	50	150,000	5.00	Yr. Je. '30	7.97

The Industry's Bonds

1932 Feb. Last	1932 High	1932 Low	1932 High	1932 Low	1931 High	1931 Low	Sales In Feb.	Sales During 1932	ISSUE	Date Due	Int. %	Int. Period	Out-standing $
									NEW YORK STOCK EXCHANGE				
...	75	72	75	69	99	69¼*	7	20	Amer. Cyan. deb. 5s	1942	5	A. O.	4,554,000
67	69	66	70	55	102	52*	253	555	Amer. I. G. Chem. conv. 5½s	1949	5½	M. N.	29,933,000
90	94½	89	96	89*	104½	85½*	263	524	Am. Smelt & Ref. 1st. 5s. "A"	1947	5	A. O.	36,578,000
12	12½	10½	12½†	7	63½	7½*	70	171	Anglo-Chilean s. f. deb. 7s	1945	7	M. N.	14,600,000
...	91	86	93	85½	103	89*	36	96	Atlantic Refin. deb. 5s	1937	5	J. J.	14,000,000
...	...	...	60	60	104	59*		3	Interlake Iron Corp. 1st 5½s "A"	1945	5½	M. N.	6,629,000
103	103	101½	103†	100½	105½	100	20	32	Corn Prod. Refin. 1st s. f. 5s	1934	5	M. N.	1,822,000
10¾	13	10½	10½	10	75½	6	199	557	Lautaro Nitrate conv. 6s	1954	6	J. J.	32,000,000
72	72	68	72⅜	69	96	67¼*	53	142	Pure Oil s. f. 5½% notes	1937	5½	F. A.	17,500,000
85	88	85	89	80	103	80*	51	206	Solvay Am. Invest. 5% notes	1942	5	M. S.	15,000,000
100½	102	99¼	101½	99½	105½	98¼*	1,478	2,492	Standard Oil, N. J. deb. 5s	1946	5	F. A.	120,000,000
92½	92½	87½	92½†	87	106½	85*	118	331	Standard Oil, N. Y. deb. 4½s	1951	4½	J. D.	50,000,000
...	...	...	63	50	99	45*		11	Tenn. Corporation deb. 6s. "B"	1944	6	M. S.	3,308,000
									NEW YORK CURB				
93½	96	92½	98⅞	91	105½	93½*	232,000	655,000	Aluminum Co., s. f. deb. 5s	1952	5	M. S.	37,115,000
...	69	64½	71½	64½	104¼	66*	54,000	105,000	Aluminum Ltd., 5s	1948	5	J. J.	20,000,000
...	22	16½	22†	15	56	10	6,000	16,000	Amer. Solv. & Chem. 6½s	1936	6½	M. S.	1,737,000
...	...	...	...	...	43	29			General Rayon 6s. "A"	1948	6	J. D.	5,085,000
94¼	95½	93	95	92½	103⅛	40½	181,000	411,000	Gulf Oil, 5s	1937	5	J. D.	30,414,000
...	96	92½	95½	92½	104	74*	259,000	431,000	Sinking Fund deb. 5s	1947	5	F. A.	35,000,000
78½	79	71½	79†	64	102⅛	66*	90,000	324,000	Koppers G. & C. deb. 5s	1947	5	J. D.	23,050,000
71	76	67½	76†	67½	98⅜	56	100,000	339,000	Shawinigan W. & P. 4½s. "A"	1967	4½	A. O.	35,000,000
...	74½	70½	75½	70½	98½	58*	70,000	106,000	4½s., series "B"	1968	4½	M. N.	16,108,000
99½	99½	97	100	98½	104	99¼*	71,000	249,000	Swift & Co., 5s	1944	5	J. J.	22,916,000
...	100	99	100½	99*	104½	95*	15,000	51,000	Westvaco Chlorine Prod. 5½s	1937	5½	M. S.	1,992,000

†New High.
*New Low.

Chemical Exports and Imports

For the first time since the war years, according to the statement of the Chemical Division, Bureau of Foreign and Domestic Commerce, Dept. of Commerce, this country showed a favorable chemical trade balance of some $12,000,000. Trade both ways showed marked declines, exports 24 per cent less than in 1930 and imports off 31 per cent. A more detailed summary of important changes may be found on page 265. Figures given below afford a complete monthly comparison of exports and imports.

U. S. Chemical Export Figures for December and for 1931 Summarized*

ARTICLES, AND COUNTRIES TO WHICH EXPORTED	UNIT OF QUANTITY	DECEMBER—				TWELVE MONTHS ENDING DECEMBER—			
		1930		1931		1930		1931	
GROUP 8.—CHEMICALS AND RELATED PRODUCTS			8,807,619		6,829,922		127,855,358		100,133,158
A. COAL-TAR PRODUCTS			1,287,863		681,407		17,556,312		10,346,921
Benzol	Gal	3,119,182	654,739	383	132	44,600,329	9,565,534	21,861,140	3,794,902
Crude coal tar	Bbl[1]	2,167	7,760	746	3,667	86,823	273,860	71,037	206,742
Coal-tar pitch	Ton	133	3,384	29,122	273,827	27,221	289,655	50,667	493,024
Creosote oil	Gal			59,373	8,739			1,872,545	253,830
Coal-tar colors, dyes, stains, and color lakes	Lb	2,482,162	547,374	1,203,312	335,602	28,267,340	6,245,830	20,312,768	4,738,737
Other coal-tar products, exclusive of medicinals	Lb	2,794,577	74,606	633,745	59,440	45,931,877	1,181,433	13,442,924	859,686
C. INDUSTRIAL CHEMICAL SPECIALTIES			966,392		781,009		15,589,257		13,753,889
Nicotine sulphate (40% basis)	Lb	4,250	4,682	2,836	2,910	635,017	309,477	248,392	203,260
Lead arsenate	Lb	52,424	6,114	4,780	444	2,270,980	263,603	1,788,345	176,212
Calcium arsenate	Lb	160,220	8,823	208,827	8,352	3,177,335	166,647	2,145,653	101,168
Other agricultural insecticides, fungicides, and similar preparations and materials	Lb	683,593	50,689	289,512	23,882	8,351,884	717,899	6,975,466	718,301
Household insecticides and exterminators	Lb	495,425	139,106	281,932	64,362	12,318,734	3,788,975	7,355,168	2,184,841
Household disinfectants, deodorants, germicides, and similar preparations	Lb	221,677	16,963	149,239	12,311	2,304,164	289,407	2,439,875	283,070
D INDUSTRIAL CHEMICALS			1,670,948		1,456,934		23,015,044		19,774,027
Acids and anhydrides—									
Organic (exclusive of coal-tar acids)	Lb			28,567	4,584			559,254	89,949
Inorganic—									
Nitric	Lb			27,852	2,285			678,951	50,518
Sulphuric	Lb	438,836	7,231	262,548	3,852	5,470,979	113,923	3,202,483	60,406
Hydrochloric (muriatic)	Lb			453,289	5,992			3,999,123	69,781
Boric (boracic)	Lb	237,911	9,881	1,025,050	33,635	2,804,269	124,935	4,221,490	194,457
Other inorganic acids and anhydrides	Lb	1,535,755	155,368	438,644	11,087	12,125,580	845,890	3,572,019	245,404
Alcohols—									
Methanol	Gal	90,111	41,092	54,535	20,046	951,938	482,717	582,925	240,659
Glycerol (glycerin)	Lb	65,477	10,058	18,858	2,189	607,690	102,892	328,143	48,095
Butanol (butyl alcohol)	Lb			5,390	773			861,140	104,751
Other alcohols	Lb	257,888	37,267	218,063	18,615	3,357,648	441,347	1,862,285	177,594
Acetone	Lb	927,748	58,817	358,099	22,983	3,644,535	341,980	3,845,821	282,682
Carbon tetrachloride	Lb			65,544	4,207			491,975	28,892
Carbon bisulphide	Lb			193,906	12,356			2,090,855	125,805
Formaldehyde (formalin)	Lb	206,179	14,653	184,498	9,266	3,768,595	245,608	2,904,847	162,685
Ethylene compounds	Lb			60,480	9,493			718,101	127,043
Other synthetic organic products	Lb	44,514	11,681	324,681	40,688	1,325,772	245,730	2,235,006	415,935
Nitro or aceto cellulose solutions, collodion, etc.	Lb	65,500	20,197	95,850	18,514	1,827,882	520,083	2,200,215	535,636
Ammonium compounds (except sulphate, phosphate, and anhydrous ammonia)	Lb	56,529	5,440	96,819	6,079	2,364,765	128,667	1,263,075	111,135
Aluminum sulphate	Lb	3,511,829	38,047	7,275,333	53,174	50,509,196	573,234	55,335,478	568,490
Other aluminum compounds	Lb	176,324	17,718	103,990	10,092	2,018,016	194,503	1,749,285	170,585
Calcium compounds—									
Carbide	Lb	277,110	12,153	237,465	11,694	3,987,041	180,301	2,833,978	121,127
Chlorinated lime or bleaching powder	Lb	155,341	4,329	195,450	6,652	2,948,916	90,069	1,720,637	59,124
Chloride	Lb	1,117,218	13,744	988,668	11,095	42,699,033	513,577	48,702,903	566,573
Citrate of lime	Lb			818,244	82,858			5,043,653	584,373
Other, except arsenate and cyanide	Lb	379,596	40,773	41,202	2,162	4,991,118	558,183	1,626,096	87,150
Copper sulphate (blue vitriol)	Lb	872,988	45,902	516,780	15,802	5,061,554	252,614	7,190,919	276,575
Hydrogen peroxide (or dioxide)	Lb	150,128	24,157	69,072	12,223	1,917,456	304,081	1,319,743	207,504
Potassium compounds (not fertilizers)	Lb	189,815	31,445	84,464	16,332	2,512,158	498,774	2,317,618	370,935
Sodium compounds	Lb	36,712,866	777,666	37,461,522	715,780	518,243,336	10,627,388	502,669,470	9,959,084
Bichromate and chromate	Lb	311,585	19,567	540,212	34,505	4,932,528	326,696	4,407,460	287,794
Cyanide	Lb	134,720	20,308	117,375	17,584	1,242,421	180,581	1,121,173	161,482
Borate (borax)	Lb	11,668,715	243,080	16,840,717	287,427	165,862,630	3,057,794	173,876,415	3,358,609
Silicate (water glass)	Lb	3,442,899	29,290	4,483,657	37,337	60,494,346	571,695	58,577,134	522,577
Soda ash	Lb	5,811,762	85,351	3,860,877	58,579	65,872,703	1,138,899	55,277,087	857,714
Sal soda	Lb	693,449	8,979	526,553	8,030	13,073,425	196,581	9,057,981	125,607
Bicarbonate (acid soda or baking soda)	Lb	1,381,153	26,145	1,301,508	21,829	19,817,786	369,817	18,710,754	330,239
Sulphate	Lb	842,531	9,749	64,441	1,195	8,872,462	113,253	9,304,887	75,784
Bisulphate (niter cake)	Lb			827,270	3,952			26,702,591	147,901
Hydroxide (caustic soda)	Lb	9,422,574	271,756	7,966,887	198,278	126,379,052	3,706,382	131,188,930	3,464,525
Sulphide	Lb			29,916	808			687,060	22,178
Fluorides	Lb			2,875	138			131,127	12,502
Sodium phosphates (mono, di, or tri)	Lb			497,167	14,799			6,129,123	187,657
Other sodium compounds	Lb	3,003,478	63,441	402,067	31,319	51,695,983	965,690	7,497,748	404,515
Tin compounds	Lb	55,700	9,972	5,878	1,380	562,145	138,440	652,890	126,772
Zinc compounds	Lb	259,281	9,496	124,281	6,156	3,116,810	129,134	2,021,829	87,914
Gases, compressed and liquefied—									
Ammonia, anhydrous	Lb	179,944	23,562	104,344	14,969	2,272,100	338,890	1,891,512	234,589
Chlorine	Lb	605,756	18,619	906,311	22,210	7,531,777	256,372	8,842,967	247,731
Other gases, n. e. s.	Lb	162,831	32,138	137,773	24,662	2,368,882	398,594	2,398,173	343,840
Other industrial chemicals			199,542		223,049		4,367,118		2,690,234
E. PIGMENTS, PAINTS, AND VARNISHES			1,522,047		951,578		21,689,217		15,126,846
Mineral earth pigments	Lb	1,522,700	36,674			45,132,189	535,193		
Ocher, umber, sienna, and other forms of iron oxide for paints	Lb			798,248	16,909			16,612,378	272,373
Other mineral-earth pigments (whiting, barytes, etc.)	Lb			577,211	5,135			16,444,055	156,982

*Compiled from Monthly Summary of Foreign Trade of the United States, of the Dept. of Commerce

U. S. Chemical Export Figures (*Continued*)

ARTICLES, AND COUNTRIES TO WHICH EXPORTED	UNIT OF QUANTITY	DECEMBER— 1930		DECEMBER— 1931		TWELVE MONTHS ENDING DECEMBER— 1930		TWELVE MONTHS ENDING DECEMBER— 1931	
GROUP 8.—CHEMICALS AND RELATED PRODUCTS—Continued.									
Chemical pigments—									
Zinc oxide	Lb.	1,142,449	77,174	306,007	24,415	21,506,724	1,446,904	10,261,944	717,224
Lithopone	Lb.	454,423	21,393	463,595	20,971	7,330,532	380,047	7,641,554	341,257
Bone black and lampblack	Lb.	160,709	7,887	157,315	9,664	3,674,043	187,093	2,773,088	130,616
Carbon black	Lb.	7,384,764	448,034	8,116,422	389,638	84,270,447	5,789,458	96,714,116	5,078,838
Red lead, litharge, and orange mineral	Lb.	551,700	40,601	459,790	25,026	8,255,207	590,285	6,172,859	384,929
White lead	Lb.	1,435,642	95,249	450,601	21,220	13,092,212	923,281	10,016,813	562,228
Other chemical pigments	Lb.	363,140	53,942	550,345	64,699	6,062,924	863,665	5,886,832	739,583
Bituminous paints, liquid and plastic			47,453		22,818		746,924		478,994
Paste paint	Lb.	115,285	20,520	237,937	34,550	1,784,719	354,309	4,054,102	529,310
Kalsomine or cold-water paints, dry	Lb.	584,129	28,417	409,982	21,056	8,532,791	444,356	6,358,897	333,218
Nitrocellulose (pyroxylin) lacquers—									
Pigmented	Gal.	11,355	37,851	21,852	57,910	255,597	862,397	332,951	949,658
Clear	Gal.	1,945	5,833	5,079	9,930	71,346	149,245	94,339	197,807
Thinners for nitrocellulose lacquers	Gal.			22,478	25,020			305,295	370,229
Ready-mixed paints, stains, and enamels	Gal.		436,968	88,158	173,870		5,757,333	1,598,636	3,308,871
Varnishes (oil or spirit, and liquid dryers)	Gal.	47,241	90,852	20,006	27,917	773,886	1,442,188	377,430	546,859
Paint and varnish removers	Gal.		73,199	546	830		1,216,539	18,592	27,870
F. FERTILIZERS AND FERTILIZER MATERIALS	Ton.	71,933	639,126	80,469	1,049,314	1,551,559	15,284,315	1,243,834	13,011,323
Nitrogenous fertilizer materials—									
Ammonium sulphate	Ton.	3,072	101,105	4,732	133,373	81,662	2,909,616	66,902	2,220,265
Other nitrogenous materials	Ton.	2,092	88,049			25,552	1,158,870		
Other nitrogenous chemical materials	Ton.			6,901	189,189			65,856	2,479,867
Nitrogenous organic waste materials	Ton.			244	8,856			5,870	131,537
Phosphatic fertilizer materials—									
Phosphate rock—									
High-grade hard rock	Ton.	3,160	$21,657	13,263	$79,423	65,992	$447,432	105,293	$613,957
Land pebble	Ton.	55,846	265,572	40,152	163,188	1,159,730	5,183,115	846,012	3,663,113
Superphosphates (acid phosphates)	Ton.	5,715	75,827	5,569	66,316	111,659	1,595,450	81,754	940,688
Other phosphate materials	Ton.			229	7,870			4,008	183,319
Potassic fertilizer materials	Ton.	393	18,928			15,216	643,367		
Potassium chloride or muriate	Ton.			8,134	357,922			27,938	1,228,584
Other potash fertilizers	Ton.			91	2,574			1,044	38,525
Concentrated chemical fertilizers	Ton.	1,117	52,401			55,289	1,869,310		
Nitrogenous phosphatic types	Ton.			954	32,279			33,146	1,280,703
Nitrogenous potassic types	Ton.							20	800
Nitrogenous phosphatic potassic types	Ton.							227	6,089
Prepared fertilizer mixtures	Ton.	538	15,587	200	8,324	36,459	1,477,155	5,764	223,876

U. S. Chemical Import Figures for December and for 1931 Summarized

ARTICLES, AND COUNTRIES FROM WHICH IMPORTED	UNIT OF QUANTITY	DECEMBER— 1930 Quantity	DECEMBER— 1930 Value	DECEMBER— 1931 Quantity	DECEMBER— 1931 Value	TWELVE MONTHS ENDING DECEMBER— 1930 Quantity	TWELVE MONTHS ENDING DECEMBER— 1930 Value	TWELVE MONTHS ENDING DECEMBER— 1931 Quantity	TWELVE MONTHS ENDING DECEMBER— 1931 Value
GROUP 8.—CHEMICALS AND RELATED PRODUCTS			$6,755,912		$4,743,036		$112,069,775		$82,738,027
A. COAL-TAR PRODUCTS			752,242		621,959		16,273,163		11,162,846
Crudes—									
Dead or creosote oil—free	Gal.	1,488,391	163,362	1,172,156	130,918	66,921,827	7,806,175	36,884,900	3,597,672
All other—free			81,850		59,726		1,376,317		792,724
Intermediates—									
Acids—dut.	Lb.			35,460	35,118	824,749	52,758	817,434	79,651
All other—dut.	Lb.	82,761	40,128	21,602	13,621	1,422,668	1,022,490	874,511	599,316
Finished products—									
Colors, dyes, stains, color acids, and color bases, n. e. s.—dut.	Lb.	359,106	417,192	296,677	316,115	4,951,964	5,284,166	4,944,141	5,511,855
Belgium	Lb.	2,674	2,579	772	1,064	63,010	80,686	48,566	58,819
France	Lb.	7,069	8,967			43,686	57,239	67,830	104,505
Germany	Lb.	239,745	270,793	189,424	209,428	3,102,836	3,318,115	2,826,974	3,065,224
Italy	Lb.	4,844	6,549	1,202	1,813	21,298	24,564	15,472	18,683
Switzerland	Lb.	92,182	113,943	98,053	95,547	1,556,607	1,637,126	1,831,778	2,104,661
United Kingdom	Lb.	11,511	12,099	5,887	6,097	114,174	118,766	106,796	117,027
Coal-tar medicinals—dut.	Lb.	1,106	13,969	2,536	30,469	71,616	272,881	39,281	251,610
Other finished coal-tar products—dut.	Lb.	10,796	35,741	13,997	35,992	149,869	458,376	100,560	330,018
B. MEDICINAL AND PHARMACEUTICAL PREPARATIONS			385,111		410,660		4,947,534		3,973,072
Quinine sulphate—free	Oz.	102,016	36,093	275,000	83,981	1,253,114	449,491	1,499,391	498,212
Other quinine and other alkaloids and salts from cinchona bark—free	Oz.	2,500	928	238,500	95,817	876,593	332,916	754,837	292,454
Other alkaloids, salts and derivatives—dut.			25,645		2,371		275,510		136,439
Antitoxins, serums, vaccines, etc., and blistering beetles—free			3,139				5,162		3,215
Menthol—dut.	Lb.	30,340	87,505	34,840	76,271	307,715	1,016,725	326,113	878,422
Santonin and salts—free	Lb.					[2] 273	[2] 32,049	714	69,526
Other medicinals—dut.			9,846		4,480		282,183		75,254
All other preparations, n. e. s.—dut.			221,955		147,740		2,553,498		2,019,550
D. INDUSTRIAL CHEMICALS			1,856,255		1,418,198		23,299,981		17,198,840
Acetylene, butylene, ethylene, and propylene derivatives—dut.	Lb.	18,528	4,850	51,521	3,401	[2] 282,483	[2] 29,497	566,798	72,561
Acids and anhydrides—									
Acetic, or pyroligneous—dut.	Lb.	1,633,142	84,268	1,036,220	55,105	22,377,004	1,498,414	15,291,530	802,806
Arsenious (white arsenic)—free	Lb.	987,578	32,779	1,179,735	36,866	21,559,078	744,418	15,531,189	449,585
Formic—dut.	Lb.	22,932	1,152	11,111	598	509,966	36,598	140,063	7,936
Oxalic—dut.	Lb.	10,576	559	11,610	600	574,184	30,731	488,996	25,683
Sulphuric (oil of vitriol)—free	Lb.	122,900	799			917,566	6,158	2,343,614	22,034
Tartaric—dut.	Lb.	446,349	94,876	191,333	36,221	2,911,756	779,091	2,245,925	477,324
All other—free	Lb.	95	86			237,680	28,577	64,347	3,863
All other—dut.	Lb.	138,459	17,524	151,435	26,457	2,092,112	295,374	1,268,472	230,898

U. S. Chemical Import Figures (*Continued*)

ARTICLES, AND COUNTRIES FROM WHICH IMPORTED	UNIT OF QUANTITY	DECEMBER— 1930 Quantity	DECEMBER— 1930 Value	DECEMBER— 1931 Quantity	DECEMBER— 1931 Value	TWELVE MONTHS ENDING DECEMBER— 1930 Quantity	TWELVE MONTHS ENDING DECEMBER— 1930 Value	TWELVE MONTHS ENDING DECEMBER— 1931 Quantity	TWELVE MONTHS ENDING DECEMBER— 1931 Value
GROUP 8.—CHEMICALS AND RELATED PRODUCTS			$6,755,912		$4,743,036		$112,069,775		$82,738,027
Alcohols, n. e. s., including fusel oil	dut.		368		206		30,328		11,306
Ammonium compounds, n. e. s.—									
Chloride (muriate)	dut.	Lb. 852,506	28,457	566,929	15,879	6,627,838	208,322	5,672,472	162,223
Nitrate	dut.	Lb. 482,680	15,545	539,405	15,456	8,164,805	263,997	6,705,903	191,749
All other	dut.	Lb. 45,047	2,732	16,612	954	661,105	39,003	525,678	29,985
Barium compounds	dut.	Lb. 593,517	9,522	104,331	1,952	6,705,568	98,070	4,186,287	94,963
Calcium compounds, n. e. s.	dut.	Lb. 532,480	20,342	126,000	4,630	1,977,775	76,396	412,720	15,443
Cellulose products, n. e. s.—									
Acetate	dut.	Lb. 3,355	4,955	56	63	[2] 5,633	[2] 7,641	48,437	45,378
All other—									
Sheets, more than 1/1000 inch thick and other forms	dut.	Lb. 6,860	5,804	5,233	4,573	[2] 143,653	[2] 139,066	174,701	212,701
Sheets, bands, and strips more than 1 inch wide, not than 1/1000 inch thick	dut.	Lb. 19,574	8,695	8,447	7,053	[2] 202,944	[2] 81,442	39,835	22,976
Cobalt oxide	dut.	Lb. 41,925	67,119	23,470	23,580	425,881	769,331	318,391	387,499
Copper sulphate (blue vitriol)	free	Lb. 63,036	2,944	606,057	16,633	5,964,378	283,000	2,643,891	105,118
Glycerin—									
Crude	dut.	Lb. 1,449,621	82,809	779,880	33,061	10,906,426	633,373	9,951,473	514,606
Refined	dut.	Lb. 484,519	40,586	633,506	39,919	3,177,479	272,494	1,975,970	141,595
Iodine, crude	free	Lb. 53,917	197,601			493,587	1,797,754	278,713	998,079
Lime, chlorinated, or bleaching powder	dut.	Lb. 170,959	5,624	145,826	4,420	2,370,180	63,699	2,017,228	60,460
Magnesium compounds	dut.	Lb. 615,867	9,031	1,062,628	13,226	10,941,831	172,186	11,926,067	197,815
Potassium compounds, n. e. s.—									
Bitartrate, crude, argols, or wine lees	dut.	Lb.				[1] 6,707,139	[1] 719,150		
Argols, tartar, and wine lees	free	Lb. 1,967,640	200,370	2,288,397	139,811	[2] 11,375,387	[2] 1,116,933	19,313,911	1,604,875
Carbonate	dut.	Lb. 1,887,531	87,668	831,831	33,446	18,241,278	848,214	15,166,667	664,059
Chlorate and perchlorate	dut.	Lb. 1,038,703	37,966	1,253,203	44,567	15,106,141	540,782	12,416,242	438,634
Cream of tartar	dut.	Lb. 11,023	1,984	15,586	2,182	59,547	11,185	93,282	16,002
Cyanide	free	Lb. 1,984	737	827	304	91,242	32,089	94,361	34,219
Hydroxide (caustic potash)	dut.	Lb. 753,549	34,036	548,960	29,694	9,322,640	492,981	8,629,102	451,605
Nitrate crude (saltpeter)	free	Ton. 983	55,444	1,649	48,162	12,799	620,146	14,520	707,688
Other potassium compounds, n. e. s.	dut.	Lb. 226,911	20,934	615,564	30,018	3,943,140	251,128	7,067,100	340,512
Sodium compounds, n. e. s.—									
Sulphate crude (salt cake)	free	Lb.		10,868,058	62,448			145,492,923	803,509
Cyanide	free	Lb. 1,334,781	117,426	1,208,454	137,426	26,401,391	2,043,283	18,695,132	1,710,593
Ferrocyanide (yellow prussiate)	dut.	Lb. 121,372	9,687	61,423	5,280	1,590,361	136,601	1,185,467	101,608
Nitrite	dut.	Lb. 670	136	300	55	61,263	2,584	2,029	297
Phosphate (except pyrophosphate)	dut.	Lb. 122,112	2,188	11,615	202	[2] 1,445,312	[2] 25,745	1,467,207	26,485
Other sodium compound, n. e. s.	free		39,069				801,122		18,696
	dut.		62,981		29,109		1,302,106		631,055
Radium salts	free	Grain. 8	29,086	64	217,787	260	924,852	207	731,204
Other industrial chemicals	free		201,791		158,718		1,874,474		1,581,904
	dut.		215,725		138,136		3,171,646		2,051,309
E. PIGMENTS, PAINTS, AND VARNISHES			$159,948		$176,013		$2,612,557		$2,016,872
Mineral earth pigments—									
Iron oxide and iron hydroxide	dut.	Lb. 1,067,204	25,229	787,918	12,514	17,038,482	375,176	12,090,387	259,328
Ochers and siennas	dut.	Lb. 757,046	11,792	908,743	12,240	14,576,024	273,567	11,994,803	190,813
Other mineral earth pigments	dut.		24,787		78,223		368,304		419,921
Chemical pigments—									
Lithopone and zinc pigments, n. e. s.	dut.	Lb. 1,195,512	45,616	848,256	29,602	15,042,348	670,012	11,353,695	428,741
Zinc oxide and leaded zinc oxide	dut.	Lb. 239,813	16,881	213,681	12,479	[2] 1,246,145	[2] 89,987	2,913,685	189,477
Other chemical pigments	dut.	Lb.	9,044	206,803	14,970		379,189	3,805,808	250,938
Paints, stains, and enamels	dut.		20,497		15,195		405,493		246,348
Varnishes	dut.	Gal. 4,113	6,102	533	790	33,493	50,829	14,296	31,306
F. FERTILIZERS AND MATERIALS		Ton. 103,271	3,229,466	69,192	1,838,389	1,965,145	59,150,894	1,430,258	44,732,851
Nitrogenous—									
Ammonium sulphate	dut.	Ton.				[1] 2,845	[1] 102,493		
	free	Ton. 6,642	229,590	21,883	485,009	[2] 30,939	[2] 1,057,354	112,215	3,141,558
Ammonium sulphate-nitrate	free	Ton. 2,472	113,575	2,467	80,593	8,141	390,999	5,263	231,046
Calcium cyanimide, or lime nitrogen	free	Ton. 3,091	101,102	2,680	55,097	144,522	4,874,311	51,314	1,537,355
Calcium nitrate	free	Ton. 799	25,991	892	21,657	43,871	1,559,747	28,761	926,562
Guano	free	Ton. 1,751	65,823	74	1,797	40,431	1,655,886	13,849	503,861
Dried blood	free	Ton. 1,098	57,607	390	12,171	11,333	627,310	8,835	358,849
Sodium nitrate	free	Ton. 35,512	1,297,319	17,029	574,076	568,594	21,444,522	550,613	21,111,689
Urea and calurea	free	Ton. 712	63,983	893	65,377	[2] 7,932	[2] 714,367	7,131	569,107
Other nitrogenous	free	Ton. 12,054	297,021	3,800	62,372	102,949	3,245,379	49,089	1,529,967
Phosphates—									
Bone ash, dust, and meal, and animal carbon fertilizers	free	Ton. 3,326	80,618	3,395	72,673	59,680	1,474,500	48,979	1,080,348
Other phosphate material	free	Ton. 6,434	85,268	489	5,389	36,631	434,131	21,718	290,719
Potash fertilizers—									
Chloride, crude (muriate)	free	Ton. 9,312	343,993	6,289	230,346	273,256	9,929,801	180,539	6,517,606
Kainite	free	Ton. 4,501	38,723	695	5,620	112,013	979,487	55,329	504,534
Manure salts	free	Ton. 6,154	84,378	3,787	52,002	361,799	5,048,302	179,428	2,583,027
Sulphate, crude	free	Ton. 5,537	255,959	1,222	51,143	86,257	3,947,479	56,842	2,628,316
Other potash-bearing substances	free	Ton. 12	78	5	30	547	4,728	488	3,743
Fertilizers, compounded or chemically combined, containing nitrogen, phosphoric acid, and potash	free	Ton. 859	52,986	491	27,727	12,106	854,333	10,969	645,751
All other fertilizers	free	Ton. 3,005	35,452	2,711	35,309	61,299	805,765	48,896	568,813
G. EXPLOSIVES			9,376		21,557		910,503		520,107
Powder and other explosives, n. e. s.	dut.						104,788		132,494
Firecrackers	dut.	Lb. 52,194	7,073	121,963	16,906	4,609,265	754,276	2,490,666	349,288
Fireworks and ammunition	dut.		2,303		4,651		51,439		38,325
H. SOAP AND TOILET PREPARATIONS			353,902		254,718		4,719,396		3,027,694
Soap—									
Castile	dut.	Lb. 220,493	20,507	269,414	24,732	3,664,081	346,522	2,753,759	254,378
Toilet	dut.	Lb. 92,771	32,610	64,540	20,582	1,853,816	556,161	1,324,484	376,430
All other	dut.	Lb. 134,046	15,457	221,080	25,635	1,504,330	179,400	1,604,093	184,271
Perfume materials	free	Lb. 635	77,478	741	26,583	8,325	863,500	12,297	399,238
	dut.		74,859		40,177		1,278,394		701,801
Perfumery, bay rum, and toilet water	dut.		93,199		69,737		920,910		681,471
Bath salts	dut.	Lb. 3,447	1,488	104	80	[2] 37,984	[2] 11,431	26,626	6,871
Cosmetics, powders, creams, etc	dut.		38,304		47,192		563,078		423,234
I. ARTICLES IN GROUP 8, ORDINARILY DUTIABLE, IMPORTED FREE	free		9,612		1,542		155,747		105,745

The Trend of Prices

General commodity prices again showed slight recessions from the levels reached in the previous month. Improvement in business moved at a very slow pace although prevailing sentiment improved appreciably. Chemical Markets' Average Price for 20 representative industrial chemicals was lower; National Fertilizer Association indices were slightly lower as was the Annalist Chemical Index; that of the N. Y. Journal of Commerce showed no change from January.

Despite a sharp reduction in copper sulfate and lower prices for tartaric acid, calcium arsenate, and two or three important intermediates, prices held at fairly firm levels in February. A gradual increase in shipments was also reported from nearly every division of the industrial chemical industry.

One of the features of the chemical market was the strong position of naval stores. Turpentine and all rosin grades with one or two exceptions turned to higher levels. Apparently stocks of these commodities are now generally in strong hands, less likely to offer unusual concessions. Events in the Far East exerted a strengthening effect on both chinawood oil and camphor. The copper situation appeared to be in as great a muddle as ever, and as the month closed, international producers meeting in New York were at logger-heads as to quotas and the metal slipped down to 5⅞ cents. Lead also registered a new low and zinc prices were weak. Mercury, silver and tin, on the other hand firmed up slightly.

Activity in the fertilizer industry was at its height and conditions, generally speaking, were much better than at this time last year. Prices, however, of several of the mixing ingredients failed to hold. Outstanding were the several reductions made in imported ammonium sulfate. Dried blood prices likewise slumped down to the low figure prevailing for 1931. Activity at the Hopewell synthetic nitrate plant was increased, it was reported, to 75 per cent of capacity.

Improvement in demand for chemicals from heavy consuming industries was sporadic. The textile industry was reported to have returned to somewhere near the state of activity prevailing last November. On the other hand the glass, leather, soap and paint and varnish groups were reported as having but made very slight gains. A great deal of hope is being placed in the lift to business to come from the reentry of Ford into the market in a large way, not alone for the actual tonnages his company will consume, but also the psychological effect this will have on others. March and April are expected to show worthwhile tonnage gains and companies are stepping up production schedules in anticipation of this demand.

Chemical and allied industry indices of wholesale prices prepared by the National Fertilizer Association showed declines in the fats and oil, fertilizer materials, and mixed fertilizer groups and no change in chemicals and drugs.

	Fats & Oils	*Chem. & Drugs*	*Fert. Mat.*	*Mixed Fert.*
Jan. 30	47.6	88.8	70.2	79.1
Feb. 6	45.6	88.8	70.2	79.1
Feb. 13	45.8	88.8	70.0	79.1
Feb. 20	46.7	88.8	70.1	76.9

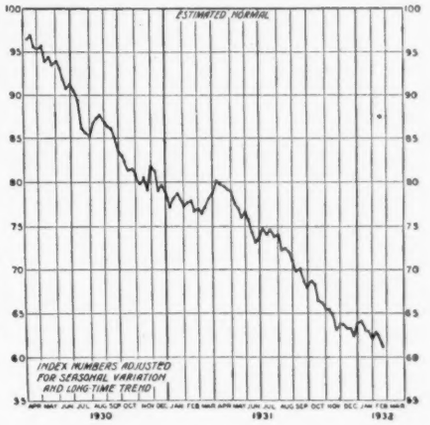
The chemical index of the *Annalist* showed a drop of one tenth of a per cent between Jan. 26 and Feb. 23 and the chemical index of the *N. Y. Journal of Commerce* remained unchanged.

General Business

But very slight improvement was reported in business generally in February. Retail trade was aided by colder weather for a few days near the month's close and "bargain" sales were numerous. Wholesale distributors were still untouched by any "booms" and the heavy industries continued to hold operations to a minimum. The steel industry is making an attempt to raise prices but no improvement in production figures appears likely for the next few weeks. At that time the automobile producers are expected to enter the market in a more substantial way and the railroads are likely to increase commitments.

Prices in the commodity markets were subjected to further pressure during the month and prominent indices of wholesale prices moved into slightly lower ground. Sugar, copper, and rubber registered new all-time lows. All of the metals with the exception of tin and silver were extremely weak in the face of continued restrictive buying. Some strength in prices for paints was in evidence. The grain markets were generally higher in sympathy with the rise in the stock market.

The *N. Y. Times'* weekly index of business activity declined further to a new record low level.



The following table gives the combined index and its components, each of which is adjusted for seasonal variations and where necessary for long-time trend:

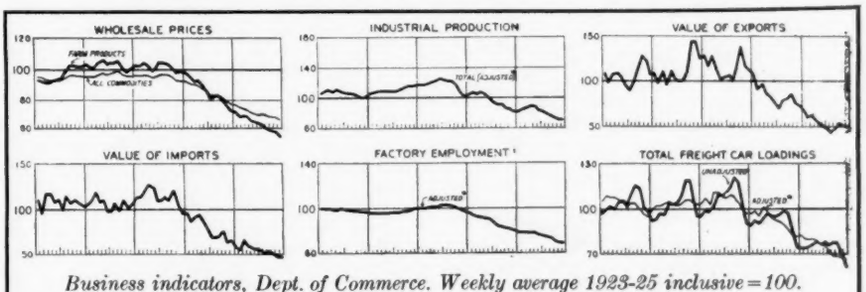
	Week Ended		
	Feb. 20	*Feb. 13*	*Feb. 21*
	1932	*1932*	*1931*
Freight car loadings	*60.8	62.1	76.7
Steel mill activity	27.7	28.9	57.8
Electric power prod.	72.6	73.7	85.0
Automobile production	37.1	38.4	55.9
Carded cot. cloth prod.	97.6	95.4	83.5
Combined index	*61.2	62.3	76.7

*Subject to revision.

Indices of Business

	Latest Available Month	Previous Month	Year Ago
Automobile Production, Jan.	119,344	121,541	171,848
†Brokers Loans, Feb. 1	$512	$587	$1,720
*Building Contracts, Jan.	$84,798	$136,851	$227,956
*Car Loadings, Feb. 27	562	574	720
†Commercial Paper, Jan. 31	$98	$117	$327
Payrolls, Dec.	55.8	56.2	73.7
*Mail Order Sales, Jan.	31,975	58,821	41,459
Failures, Dun, Jan.	3,458	2,758	3,316
*Merchandise Imports, Jan.	$136,000	$153,000	$183,148
*Merchandise Exports, Jan.	$150,000	$184,000	$249,598
Furnaces in Blast, Feb. 1	19.4	17.8	32.5
*Steel Orders, Jan. 31	2,648	2,735	4,132

*000 omitted. †000,000 omitted.



Business indicators, Dept. of Commerce. Weekly average 1923-25 inclusive = 100. The solid line represents 1931 and the dotted line 1930

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1931 Average $1.404 - Jan. 1931 $1.283 - Feb. 1932 $1.57

Important Price Changes

Advances	Dec.	Nov.
Antimony	$ .06½	$ .05⅞
Mercury	67.50	65.00
Rosin, all grades but W G and W W higher		
Tin	.22⅛	.21⅞
Turpentine	.41¼	.39

Declines		
Acids, Gamma	.75	.77
Sulfanilic	.14½	.15
Tartaric	.24½	.25½
Ammonium sulfate, tech	18.50	20.00
Egg albumen	.84	.85
Alphanaphthol, crude	.57	.60
Blood, dried	1.65	1.80
Calcium arsenate	.05½	.06
Casein, standard dom	.07	.07½
Copper metal	5.75	7.25
Copper sulfate	2.75	3.10
Lead, metal, N. Y.	3.25	3.75
Lead acetate, brown	9.00	9.50
Paris green	.23	.26

Acetone — No decided improvement in business appeared during the past month. Activity in the automobile centers was disappointing but a decided improvement is looked for shortly brought about it is expected by the reentry of the Ford interests into active operations on a large scale. Statistics for sales of paints, varnishes and lacquers during all of last year revealed these to be the smallest in point of value during the past four years. The Department of Commerce in a survey of reports by 588 manufacturers put the total sales for 1931 at $278,381,754 against $348,400,057 in 1930, $435,101,295 in 1929 and $420,824,062 in 1928. Of the classified sales as reported by 315 manufacturers amounting to $188,157,513, $238,269,381, $298,367,857 and $285,521,843 in the four years mentioned, $112,204,929, $135,210,855, $155,579,848 and $151,355,554 were trade sales and $74,765,884, $100,454,019, $140,073,385 and $132,450,932 industrial. Thus at a glance it may be seen that the decline in industrial sales was much larger than in trade, which bears out the sharp drop in construction during the past two years. In this same survey total December sales were reported at $13,425,650 for 1931, $16,686,133 for 1930, $22,204,844 for 1929 and $26,034,475 for 1928.

Acid Acetic — Textile centers increased operations and shipments into these centers were in better volume than has been reported in three months. Prices were firm.

	Current Market	1932 Low	1932 High	1931 High	1931 Low	1930 High	1930 Low
Acetaldehyde, drs 1c-1 wks...lb.	.18½	.21	.18½	.21	.18½	.21	.18½
Acetaldol, 50 gal dr.....lb.	.27	.31	.27	.31	.27	.31	.27
Acetamide.....lb.	.95	1.35	.95	1.35	.95	1.35	1.35	1.20
Acetanilid, tech, 150 lb bbl...lb.	.20	.23	.20	.23	.20	.23	.23	.21
Acetic Anhydride, 92-95%, 100 lb cbys.....lb.	.21	.25	.21	.25	.21	.25	.29	.25
Acetin, tech drums.....lb.	.30	.32	.30	.32	.30	.32	.32	.30
Acetone, tanks.....lb.	....	.10	....	.10	.10	.10½	.12	.11
Acetone Oil, bbls NY.....gal.	1.15	1.25	1.15	1.25	1.15	1.25	1.25	1.15
Acetyl Chloride, 100 lb cby...lb.	.55	.68	.55	.68	.55	.68	.68	.55
Acetylene Tetrachloride (see tetrachlorethane)								
Acids								
Acid Abietic	.12	.12	.12	.12	.12	.12	.....	.....
Acetic, 28% 400 lb bbls c-l wks.....100 lb.	2.40	2.60	2.40	2.60	2.40	2.60	3.88	2.60
Glacial, bbl c-l wk.....100 lb.	8.35	8.60	8.35	8.60	8.35	9.23	13.68	9.23
Glacial, tanks.....	8.10	.....	8.10	....	8.10	8.98	13.43	8.98
Adipic.....	.72	.72	.72	.72	.72	.72	.....	.....
Anthranilic, refd, bbls.....lb.	.85	.95	.85	.95	.85	.95	1.00	.85
Technical, bbls.....lb.	.65	.70	.65	.70	.65	.80	.80	.75
Battery, cbys.....100 lb.	1.60	2.25	1.60	2.25	1.60	2.25	2.25	1.60
Benzoic, tech, 100 lb bbls....lb.	.35	.45	.35	.45	.35	.45	.53	.40
Boric, crys. powd, 250 lb bbls.....lb.	.06½	.07	.06½	.07	.06½	.07½	.07½	.06½
Broenner's, bbls.....lb.	1.20	1.25	1.20	1.25	1.20	1.25	1.25	1.20
Butyric, 100% basis cbys.....lb.	.80	.85	.80	.85	.80	.85	.90	.80
Camphoric.....lb.	.....	5.25	.....	5.25	.....	5.25	5.25	5.25
Chlorosulfonic, 1500 lb drums wks.....lb.	.04½	.05½	.04½	.05½	.04½	.05½	.05½	.04½
Chromic, 99½%, drs.....lb.	.13½	.14½	.13½	.14½	.14½	.17	.19	.15
Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.00	1.06	1.00	1.06	1.06	1.00
Citric, USP, crystals, 230 lb bbls.....lb.	.....	.33½	.....	.33½	.33½	.43	.59	.40
Cleve's, 250 lb bbls.....lb.	.52	.54	.52	.54	.52	.54	.54	.52
Cresylic, 95%, dark drs NY..gal.	.42	.47	.42	.47	.42	.60	.70	.54
97-99%, pale drs NY.....gal.	.49	.50	.49	.50	.49	.60	.77	.58
Formic, tech 90%, 140 lb. cby.....lb.	.10½	.12	.10½	.12	.10½	.12	.12	.10½
Gallic, tech, bbls.....lb.	.60	.70	.60	.70	.60	.70	.55	.50
USP, bbls.....lb.	.....	.74	.....	.74	.....	.74	.74	.74
Gamma, 225 lb bbls wks.....lb.	.75	.77	.75	.80	.77	.80	.80	.77
H, 225 lb bbls wks.....lb.	.60	.65	.60	.65	.60	.70	.70	.65
Hydriodic, USP, 10% soln cby lb.	.....	.67	.....	.67	.....	.67	.67	.67
Hydrobromic, 48%, coml, 155 lb cbys wks.....lb.	.45	.48	.45	.48	.45	.48	.48	.45
Hydrochloric, CP, see Acid Muriatic							.....	.....
Hydrocyanic, cylinders wks...lb.	.80	.90	.80	.90	.80	.90	.90	.80
Hydrofluoric, 30%, 400 lb bbls wks.....lb.	.....	.06	.....	.06	.....	.06	.06½	.06
Hydrofluosilicic, 35%, 400 lb bbls wks.....lb.	...11	.12	.11	.12	.11	.12	.12	.11
Hypophosphorous, 30%, USP, demijohns.....lb.	.....	.85	.....	.85	.....	.85	.85	.85
Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½	.04	.04½	.04	.04½	.05	.04
44%, light, 500 lb bbls.....lb.	.11½	.12	.11½	.12	.11½	.12	.12	.11
Laurent's, 250 lb bbls.....lb.	.36	.42	.36	.42	.36	.42	.42	.36
Linoleic.....lb.	.16	.16	.16	.16	.16	.16	.....	.....
Malic, powd., kegs.....lb.	.45	.60	.45	.60	.45	.60	.60	.45
Metanilic, 250 lb bbls.....lb.	.60	.65	.60	.65	.60	.65	.65	.60
Mixed Sulfuric-Nitric.....								
tanks wks.....N unit	.07	.07½	.07	.07½	.07	.07½	.07½	.07
tanks wks.....S unit	.008	.01	.008	.01	.008	.01	.01	.008
Monochloroacetic, tech bbl..lb.	.20	.30	.20	.30	.20	.30	.30	.18
Monosulfonic, bbls.....lb.	1.65	1.70	1.65	1.70	1.65	1.70	1.70	1.65
Muriatic, 18 deg, 120 lb cbys c-l wks.....100 lb.	.....	1.35	.....	1.35	.....	1.35	1.35	1.35
tanks, wks. 100 lb.	.....	1.00	.....	1.00	.....	1.00	1.00	1.00
20 degrees, cbys wks...100 lb.	.....	1.45	.....	1.45	.....	1.45	....	1.45
N & W, 250 lb bbls.....	.85	.95	.85	.95	.85	.95	.95	.85
Naphthionic, tech, 250 lb.....	.60	.65	.60	.65	.60	.65	Nom.	.....
Nitric, 36 deg, 135 lb cbys c-wks.....100 lb.	.....	5.00	.....	5.00	.....	5.00	5.00	5.00
40 deg, 135 lb cbys, c-l wks.....100 lb.	.....	6.00	.....	6.00	.....	6.00	6.00	6.00
Oxalic, 300 lb bbls wks NY...lb.	.11	.11½	.11	.11½	.10½	.11½	.11½	.11
Phosphoric 50%, U. S. P.....lb.	.....	.14	.....	.14	.....	.14	.14	.14
Syrupy, USP, 70 lb drs....lb.	.....	.14	.....	.14	.....	.14	.14	.14
Commercial, tanks, ...Unit.	.....	.80	.....	.80	.....	.80	.80	.80
Picramic, 300 lb bbls.....lb.	.65	.70	.65	.70	.65	.70	.70	.65
Picric, kegs.....lb.	.30	.50	.30	.50	.30	.50	.50	.30
Pyrogallic, crystals.....								
.....lb.	1.50	1.60	1.50	1.60	1.50	1.60	1.60	1.30
Salicylic, tech, 125 lb bbl.....lb.	.33	.37	.33	.37	.33	.37	.37	.33
Sulfanilic, 250 lb bbls.....lb.	.14½	.15	.14½	.16	.15	.16	.16	.15
Sulfuric, 66 deg, 180 lb cbys 1c-1 wks.....100 lb.	1.60	1.95	1.60	1.95	1.60	1.95	1.95	1.60
tanks, wks. ton	.....	15.00	.....	15.00	.....	15.00	15.50	15.00
1500 lb dr wks.....100 lb.	1.50	1.65	1.50	1.65	1.65	1.50	1.65	1.50
60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.27½	1.42½	1.42½	1.27½	1.42½	1.27½

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1931 Average $1.404 - Jan. 1931 $1.283 - Feb. 1932 $1.57

Acid Chromic — The competitive position of this commodity was unaltered during the month. Demand from the automobile producers was disappointing but some improvement was looked for in the next few weeks when it is expected production schedules will be materially increased.

Acid Citric — The competitive position between imported and domestic appeared to be eased and prices were held firm at existing levels. The Italian output of citrate of lime during the year ended November 30, 1931, was 5,505 tons, compared with 10,716 tons in 1929-30. Stocks of the Camera Agrumaria, November 30, 1931, were 7,300 tons, and indications were for an output in the current year not exceeding 2,500 tons, according to information received by the Department of Commerce from the trade commissioner at Rome. Consumption of citrate by domestic citric acid producers was estimated at 3,800 tons in 1931, compared with 6,000 tons in 1930. Production of citric acid during 1931 amounted to 3,000 tons, compared with 3,800 tons in 1930 and 4,000 tons in 1929. The 1932 production is expected to remain at the 1931 level.

Acid Formic — Improvement in the demand from both the textile and the tanning trades was reported but shipments continued to be in small quantities. Prices were unchanged.

Acid Tartaric — The highly competitive position between the domestic and imported material became more acute and brought about a reduction of one cent in domestic and a half a cent in imported.

Alcohol — Some shading of prices were reported on the part of second hands but producers were holding firmly to the announced schedules.

Aluminum Sulfate — Demand from consuming industries was small for this period of the year but prices remained unaltered. Aluminum sulfate exports showed an increase in 1931 when exports totaled 27,668 short tons compared with 25,255 tons in 1930. Export data on other aluminum compounds are not recorded separately, those exported being placed in a group "other aluminum compounds" which totaled 875 short tons valued at $170,585 in 1931 and 1,009 tons valued at $194,503 in 1930.

Ammonia Aqua — Prices held firmly and consumers in the textile centers increased their orders sufficiently to bring consumption figures for February above January.

Ammonium Sulfate — Prices in this commodity became more highly competitive during the past month when

	Current Market	1932 Low	1932 High	1931 High	1931 Low	1930 High	1930 Low
Oleum, 20%, 1500 lb. drs 1c-1 wks ton	.....	18.50	.....	18.50	.....	18.50	18.50	18.50
40%, 1c-1 wks net ton	.....	42.00	.....	42.00	.....	42.00	42.00	42.00
Tannic, tech, 300 lb bbls lb.	.23	.40	.23	.40	.23	.40	.40	.23
Tartaric, USP, gran. powd, 300 lb. bbls lb	.....	.24½	.24½	.25½	.25½	.29½	.38½	.33
Tobias, 250 lb bbls. lb.	.80	.85	.80	.85	.80	.85	.85	.85
Trichloroacetic bottles lb.	.....	2.75	.....	2.75	.....	2.75	2.75	2.75
Kegs lb.	.....	2.00	.....	2.00	.....	2.00	2.00	2.00
Tungstic, bbls lb.	1.40	1.70	1.40	1.70	1.40	1.70	1.70	1.40
Albumen, blood, 225 lb bbls lb.	.38	.40	.38	.40	.38	.40	.40	.38
dark, bbls., lb.	.12	.20	.12	.20	.12	20	.20	.12
Egg, edible lb.	.84	.87	.75	.90	.55	.60	.75	.55
Technical, 200 lb cases lb.	.62	.66	.62	.66	.48	.66	.73	.50
Vegetable, edible lb.	.60	.65	.60	.65	.60	.65	.65	.60
Technical lb.	.50	.55	.50	.55	.50	.55	.55	.50
Alcohol								
Alcohol Butyl, Normal, 50 gal drs c-l wks lb.	.1495	.1595	.1495	.1595	.1495	.17½	.18½	.17½
Drums, 1-c-1 wks lb.	.1545	.1645	.1545	.1645	.1545	.17½	.18½	.17½
Tank cars wks lb.	.....	.143	.....	.143	.143	.16½	.17½	.16½
Amyl (from pentane) Tanks wks lb.	.....	.203	.....	.203	.203	.236	.236	.236
Diacetone, 50 gal drs del gal.	1.42	1.60	1.42	1.60	1.42	1.60	1.60	1.42
Ethyl, USP, 190 pf, 50 gal bbls gal.	2.55	2.65	2.55	2.65	2.37	2.75	2.75	2.63
Anhydrous, drums gal.	.54	.58	.54	.58	.54	.60	.71	.56
No. 5,*188 pf, 50 gal drs. drums extra gal.	.....	.34½	.....	.34½	.27	.44	50	.40
*Tank, cars gal.	.....	.30½	.....	.30½	.24	.38	.48	.37
Isopropyl, ref, gal drs gal.	.60	.65	.60	.65	.60	1.00	1.00	.60
Propyl Normal, 50 gal dr. gal.	.....	1.00	.....	1.00	.....	1.00	1.00	1.00
Alcotate, tanks gal.	.....	.60	.....	.60	.60	.60	.....	.....
Aldehyde Ammonia, 100 gal dr lb.	.80	.82	.80	.82	.80	.82	.82	.80
Alpha-Naphthol, crude, 300 lb bbls lb.	.57	.58	.57	.65	.60	.65	.65	.60
Alpha-Naphthylamine, 350 lb bbls lb.	.32	.34	.32	.34	.32	.34	.34	.32
Alum Ammonia, lump, 400 lb bbls, 1c-1 wks 100 lb.	3.00	3.25	3.00	3.25	3.00	3.50	3.50	3.20
Chrome, 500 lb casks, wks 100 lb.	4.50	5.25	4.50	5.25	4.50	5.25	5.25	4.50
Potash, lump, 400 lb casks wks 100 lb.	3.00	3.50	3.00	3.50	3.00	3.50	3.50	3.10
Soda, ground, 400 lb bbls wks 100 lb.	3.50	3.75	3.50	3.75	3.50	3.75	3.75	3.50
Aluminum Metal, c-1 NY 100 lb.	22.90	24.30	22.90	24.30	22.90	24.30	24.30	24.30
Chloride Anhydrous, lb.	.05	.09	.05	.09	.05	.09	.15	.05
Hydrate, 96%, light, 90 lb bbls lb.	.16	.17	.16	.17	.16	.17	.18	.16
Stearate, 100 lb bbls. lb.	.20	.21	.20	.21	.18	.22	.26	.19
Sulfate, Iron, free, bags c-1 wks 100 lb.	1.90	1.95	1.90	1.95	1.90	1.95	2.05	1.90
Coml, bags c-1 wks 100 lb.	1.25	1.30	1.25	1.30	1.25	1.30	1.40	1.25
Aminoazobensene, 110 lb kegs lb.	.....	1.15	.....	1.15	.....	1.15	1.15	1.15
Ammonium								
Ammonia anhydrous Com. tanks	.....	.05½	.....	.05½	.....	.05½	.05½	.05½
Ammonia, anhyd, 100 lb cyl. lb.	.15½	.15½	.15½	.15½	.15½	.15½	.15½	.15½
Water, 26°, 800 lb dr del lb.	.02¾	.03	.02¾	.03	.02¾	.03¼	.03¼	.03¼
Ammonia, aqua 26° tanks	.....	.02¼	.....	.02¼	.02¼	.02¼	.02¼	.02¼
Acetate lb.	.28	.39	.28	.39	.28	.39	.39	.28
Bicarbonate, bbls., f.o.b. plant 100 lb.	.....	5.15	.....	5.15	.....	5.15	5.15	5.15
Bifluoride, 300 lb bbls lb.	.21	.22	.21	.22	.21	.22	.22	.21
Carbonate, tech, 500 lb cs. lb.	.10½	.12	.10½	.12	.09	.12	.12	.09
Chloride, white, 100 lb. bbls wks 100 lb.	4.45	5.15	4.45	5.15	4.45	5.15	5.15	4.45
Gray, 250 lb bbls wks lb.	5.25	5.75	5.25	5.75	5.25	5.75	5.75	5.25
Lump, 500 lb cks spot lb.	.11	.11½	.11	.11½	.11	.11½	.11½	.11
Lactate, 500 lb bbls lb.	.15	.16	.15	.16	.15	.16	.16	.15
Ammonium Linoleate lb.	.15	.15	.15	.15	.15	.....	.....	.....
Nitrate, tech, casks lb.	.06	.10	.06	.10	.06	.10	.10	.06
Persulfate, 112 lb kegs lb.	.25	.27½	.25	.27½	.25	.30	.30	.26
Phosphate, tech, powd, 325 lb bbls lb.	.11½	.12	.11½	.12	.11½	.12	.13	.11½
Sulfate, bulk c-1 100 lb.	.....	1.10	.....	1.10	1.10	1.80	2.10	1.75
Southern points 100 lb.	.....	1.25	.....	1.25	1.25	1.75	2.10	1.82½
Nitrate, 26% nitrogen 31.6% ammonia imported bags c. i. f. ton	34.60	35.00	34.60	35.00	34.60	35.00	57.60	45.00
Sulfocyanide, kegs lb.	.36	.48	.36	.48	.36	.48	.48	.36
Amyl Acetate, (from pentane) Tanks lb.	.....	.17½	.....	.17½	.16	.222	.236	.222
Tech., drs lb.	.17½	.18	.17½	.18	.16½	.236	.24	.225
Alcohol, see Fusel Oil								
Furoate, 1 lb tins lb.		5.00	.....	5.00	.....	5.00	5.00	5.00
Aniline Oil, 960 lb drs lb.	.14½	.16	.14½	.16	.14½	.16	.16	.15
Annatto, fine lb.	.34	.37	.34	.37	.34	.37	.37	.34
Anthraquinone, sublimed, 125 lb bbls lb.	.50	.55	.50	.55	.50	.55	.90	.50
Antimony, metal slabs, ton lots lb.	.....	.06½	.05½	.06½	.06½	.07½	.09½	.06½
Needle, powd, 100 lb cs lb.	.08½	.09	.08½	.09	.08½	.09	.09½	.08
Chloride, soln (butter of) obys lb.	.13	.17	.13	.17	.13	.17	.17	.13
Oxide, 500 lb bbls lb.	.08½	.08½	.08½	.08½	.08½	.08½	.08½	.07½
Salt, 66% tins lb.	.22	.24	.22	.24	.22	.24	.24	.22
Sulfuret, golden, bbls lb.	.16	.20	.16	.20	.16	.20	.20	.16
Vermilion, bbls lb.	.38	.42	.38	.42	.38	.42	.42	.38
Archil, conc, 600 lb bbls lb.	.17	.19	.17	.19	.17	.19	.19	.17
Double, 600 lb bbls lb.	.12	.14	.12	.14	.12	.14	.14	.12
Triple, 600 lb bbls lb.	.12	.14	.12	.14	.12	.14	.14	.12
Argols, 80% casks lb.	.....	.18½	.....	.18½	.....	.18½	.18½	.18½
Crude, 30%, casks lb.	.07	.07½	.07	.07½	.07	.08	.08	.07½

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1931 Average $1.404 - Jan. 1931 $1.283 - Feb. 1932 $1.57

imported went from $20 a ton to $18.50. Ammonium sulfate imports into United States reached a peak in 1931. The total of 114,776 long tons represents a phenomenal increase over the 1930 receipts of 34,964 tons. Prior to the World War, the U. S. imported large quantities of sulfate, early records indicating entries of over 92,000 tons in 1911 of which Scotland supplied 53,000 tons, England 33,000 tons, and Australia 2,000 tons. Installation of by-product recovery ovens at domestic coal distillation plants sharply reduced ammonium sulfate imports and made an important surplus of this fertilizer material available for export. The upward trend in imports started in 1924 when European producers of synthetic sulfate commenced large scale exporting of their material. Eight countries participated in the United States import trade during 1931. Details of the importations follow:

	Long Tons		*Long Tons*
Belgium	33,652	Canada	2,482
France	5,844	Japan	9,994
Germany	17,083	United Kingdom	1,056
Poland	2,500		
Netherlands	42,165	Total	114,776

Arsenic — Better inquiry was reported by producers as the active consuming months approached. Prices were unchanged.

Beeswax — A much firmer trend in the market was reported during February despite the fact that actual sales in volume were little improved over previous months. An appreciable gain in the quantity of beeswax shipped from Cuba was registered in 1931, although price decline was reflected in the lowered value of total exports. Cuban beeswax export figures follow: 1930, 519,500 pounds, valued at $137,217; 1931, 672,300 pounds, valued at $118,300.

Bleaching Powder — This commodity passed through a very quiet period with buyers taking only immediate needs.

Calcium Arsenate — Leading producers offered material at 5½c during February representing a reduction of ½c a pound. Demand for agricultural purposes is reported to be in fair volume.

Chlorine — Better activity in the textile field aided in moving larger tonnages but no improvement and if anything further restriction was reported by the paper industry.

Cobalt Oxide — The black material was reduced to $1.25 during February.

Copperas — Although the demand for this commodity has dropped off somewhat the continued curtailment in the steel industry has prevented any accumulation of stocks and prices are firmly held.

Cottonseed Products — The market for refined oil firmed up during the last

	Current Market		1932 Low	1932 High	1931 High	1931 Low	1930 High	1930 Low
Aroclors, wks. lb.	.20	.40	.20	.40	.20	.40	.40	.20
Arsenic, Red. 224 lb kegs, cs. lb.	.09½	.10	.09½	.10	.09½	.10	.11	.08½
White, 112 lb kegs. lb.	.04	.05	.04	.05	.03½	.05	.04½	.03½
Asbestine, c-l wks. ton	.....	15.00	.....	15.00	.....	15.00	15.00	15.00
Barium								
Barium Carbonate, 200 lb bags wks. ton	56.50	57.00	56.50	57.00	56.50	60.00	60.00	58.00
Chlorate, 112 lb kegs NY. lb.	.14	.15	.14	.15	.14	.15	.15	.14
Chloride, 600 lb bbl wks. ton	63.00	69.00	63.00	69.00	63.00	69.00	69.00	63.00
Dioxide, 88%, 690 lb drs. lb.	.12	.13	.12	.13	.12	.13	.13	.12
Hydrate, 500 lb bbls. lb.	.04½	.05½	.04½	.05½	.04½	.05½	.05½	.04½
Nitrate, 700 lb casks. lb.	.07½	.08	.07½	.08	.07½	.08½	.08½	.07½
Barytes, Floated, 350 lb bbls wks. ton	23.00	24.00	23.00	24.00	23.00	24.00	24.00	23.00
Bauxite, bulk, mines. ton	5.00	6.00	5.00	6.00	5.00	8.00	8.00	5.00
Beeswax, Yellow, crude bags. lb.	.22	.24	.22	.24	.22	.31	.34	.24
Refined, cases. lb.	.25	.28	.25	.28	.25	.37	.38	.37
White, cases. lb.	.34	.36	.34	.36	.34	.36	.53	.34
Benzaldehyde, technical, 945 lb drums wks. lb.	.60	.65	.60	.65	.60	.65	.65	.60
Benzene								
Benzene, 90%, Industrial, 8000 gal tanks wks. gal.	.....	.20	.....	.20	.18	.21	.22	.21
Ind. Pure, tanks works. gal.	.....	.20	.....	.20	.18	.21	.22	.21
Benzidine Base, dry, 250 lb bbls. lb.	.65	.67	.65	.67	.65	.67	.74	.65
Benzoyl, Chloride, 500 lb drs. lb.	.45	.47	.45	.47	.45	.47	1.00	.45
Benzyl, Chloride, tech drs. lb.	.....	.30	.....	.30	.....	.30	.25	.25
Beta-Naphthol, 250 lb bbl wk. lb.	.....	.22	.....	.22	.22	.24	.24	.22
Naphthylamine, sublimed, 200 lb bbls. lb.	1.25	1.35	1.25	1.35	1.25	1.35	1.35	1.25
Tech, 200 lb bbls. lb.	.53	.58	.53	.58	.53	.65	.65	.53
Blanc Fixe, 400 lb bbls wks. ton	75.00	90.00	75.00	90.00	75.00	90.00	90.00	75.00
Bleaching Powder								
Bleaching Powder, 800 lb drs c-l wks contract. 100 lb.	1.75	2.00	1.75	2.00	1.75	2.35	2.35	2.00
Blood, Dried, fob, NY. Unit	1.65	1.70	1.65	1.90	1.65	3.00	3.90	3.00
Chicago. Unit	1.50	1.60	1.50	1.60	1.50	2.35	4.50	2.75
S. American shipt. Unit	.....	Nom.	.....	Nom.	2.00	3.20	4.10	3.15
Blues, Bronze Chinese Milori Prussian Soluble. lb.	.....	.35	.....	.35	.....	.35	.35	.35
Bone, raw, Chicago. ton	21.00	21.50	21.00	21.50	21.00	32.00	39.00	31.00
Bone, Ash, 100 lb bags. lb.	.06	.07	.06	.07	.06	.07	.07	.06
Black, 200 lb bbls. lb.	.05½	.08½	.05½	.08½	.05½	.08½	.08½	.05½
Meal, 3% & 50%, Imp. ton	.....	21.00	.....	21.00	21.00	31.00	31.00	31.00
Borax, bags. lb.	.02½	.03½	.02½	.03½	.02½	.03½	.03½	02½
Bordeaux, Mixture, 16% pwd. lb.	.11½	.13	.11½	.13	.11½	.13	.14	.12
Paste, bbls. lb.	.11½	.13	.11½	.13	.11½	.13	.14	.12
Brazilwood, sticks, shpmt. lb.	26.00	28.00	26.00	28.00	26.00	28.00	28.00	26.00
Bromine, cases. lb.	.36	.43	.36	.43	.36	.43	.47	.38
Bronze, Aluminum, powd blk. lb.	.60	1.20	.60	1.20	.60	1.20	1.20	.60
Gold bulk. lb.	.55	1.25	.55	1.25	.55	1.25	1.25	.55
Butyl, Acetate, normal drs. lb.	.161	.166	.161	.166	.161	.175	.20	.17
Tank, wks. lb.	.....	.143	.....	.143	.143	.175	.186	.16
Aldehyde, 50 gal drs wks. lb.	.34	.36	.34	.36	.34	.44	.44	.34
Carbitol s ee Diethylene Glycol Mono (Butyl Ether)	.....	.....	.....	.....	.....	.....	.....	.....
Cellosolve (see Ethylene glycol mono butyl ether)								
Furoate, tech., 50 gal. dr., lb.	.....	.50	.....	.50	.....	.50	.50	.50
Propionate, drs. lb.	.22	.25	.22	.25	.22	.25	.27	.22
Stearate, 50 gal drs. lb.	.....	.25½	.....	.25½	.25	.30	.30	.25
Tartrate, drs. lb.	.55	.60	.55	.60	.55	.60	.60	.55
Cadmium, Sulfide, boxes. lb.	.65	.90	.65	.90	.65	.90	1.75	.90
Calcium								
Calcium, Acetate, 150 lb bags c-l. 100 lb.	.....	2.00	.....	2.00	.....	2.00	4.50	2.00
Arsenate, 100 lb bbls c-l wks. lb.	.05½	.06	.05½	.06	.06	.09	.09	.07
Carbide, drs. lb.	.05	.06	.05	.06	.05	.06	.06	.05
Carbonate, tech, 100 lb bags c-l. lb.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-l wks. ton	.....	21.00	.....	21.00	21.00	22.75	22.75	22.75
Solid, 650 lb drs c-l fob wks ton	.....	18.00	.....	18.00	18.00	20.00	20.00	20.00
Nitrate, 100 lb bags. ton	34.00	35.00	34.00	35.00	34.00	43.00	43.00	40.00
Peroxide, 100 lb. drs. lb.	.....	1.25	.....	1.25	.....	1.25	1.25	1.25
Phosphate, tech, 450 lb bbls lb.	.08	.08½	.08	.08¾	.08	.08¾	.08½	.08
Stearate, 100 lb bbls. lb.	.17	.18	.17	.18	.17	.22	.26	.19
Calurea, bags S. points, c.i.f. ton	.....	88.65	.....	88.65	.....	88.65	88.65	88.65
Camwood, Bark, ground bbls. lb.	.....	.18	.....	.18	.....	.18	.18	.18
Candelilla Wax, bags. lb.	.....	.14	.....	.14	.13	.15	.20	.15
Carbitol, (See Diethylene Gycol Mono Ethyl Ether)	.....	.....	.....	.....	.....	.....	.....	.....
Carbon, Decolorizing, 40 lb bags c-l. lb.	.08	.15	.08	.15	.08	.15	.15	.08
Black, 100-300 lb cases lc-l NY. lb.	.06	.12	.06	.12	.06	.12	.12	.06
Bisulfide, 500 lb drs lc-l NY. lb.	.05½	.06	.05½	.06	.05½	.06	.06	.05½
Dioxide, Liq. 20-25 lb cyl. lb.	.....	.06	.....	.06	.....	.06	.18	.06
Tetrachloride, 1400 lb drs delivered. lb.	.06½	.07	.06¼	.07	.06½	.07	.07	.06½
Carnauba Wax, Flor, bags. lb.	.26	.28	.26	.28	.26	.28	.37	.28
No. 1 Yellow, bags. lb.	.22	.23	.22	.24	.23	.40	.33	.25
No. 2 N Country, bags. lb.	.14	.15	.14	.16	.15	.23	.27	.20
No. 2 Regular, bags. lb.	.21	.22	.21	.22	.21	.23	.30	.23
No. 3 N. C. lb.	.11	.12	.11	.12	.11	.11	.23	.16
No. 3 Chalky. lb.	.11	.12	.11	.12	.11	.13½	.23	.16
Casein, Standard, Domestic, ground. lb.	.07	.07½	.07	.07½	.06	.10	.15½	.09½

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Cadmium Iodide
Cadmium & Potassium Iodide
Calcium Iodide
Copper Iodide
Ethyl Iodide (Ether Hydriodic)
Gold Mono-Iodide
Iodine
Iodoform
Iron Iodide
Lead Iodide
Lime USP Iodized Dark
Lithium Iodide
Magnesium Iodide
Manganese Iodide
Mercury Iodide
Mercury & Potassium Iodide
Methyl Iodide
Potassium Iodate
Potassium Iodide
Potassium Iodo-Hydrarg
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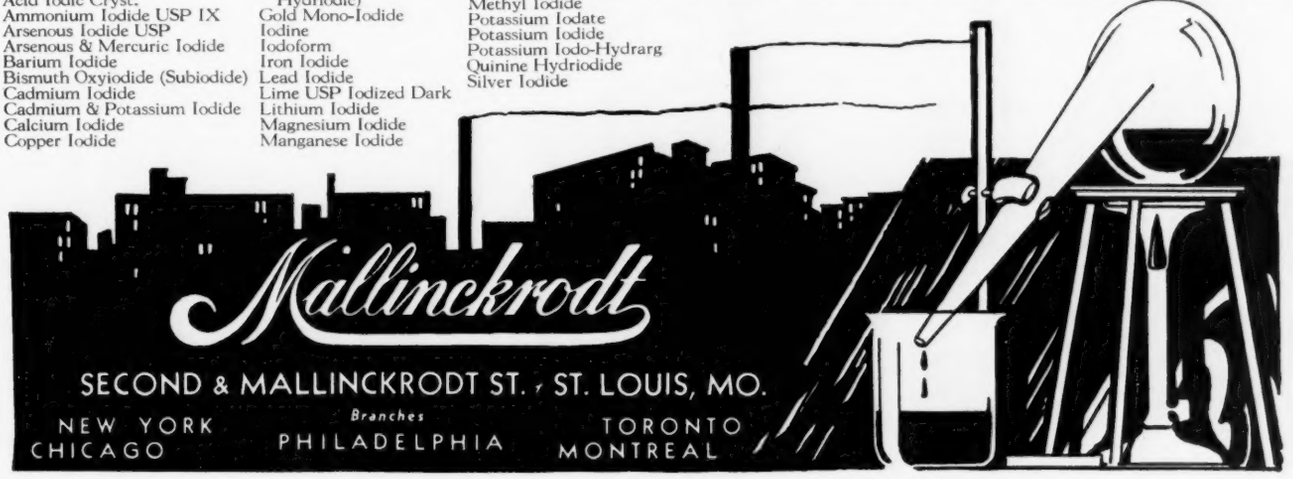

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1931 Average $1.404 - Jan. 1931 $1.283 - Feb. 1932 $1.57

half of the month due primarily to the better tone exhibited in the securities markets and the better feeling engendered by such action. The U. S. produces more than one-half of all of the cottonseed produced in the world and more than four times as much as any other country, British India being the nearest competitor. A commodity formerly regarded as of little value it has within 50 years grown from a value of less than $5,000,000 to $265,000,000, in 1929, contributing products which are being exported in various forms to all parts of the world, is shown in the following table:

Increase in Value of American Cottonseed Products

Year ended July 31	Seed crushed Quantity Tons	Seed crushed Value Thousands of dollars	Cake and meal produced Quantity Tons	Cake and meal produced Value Thousands of dollars
1881	182	4,610	64	1,840
1891	1,023	19,790	358	8,330
1901	2,415	48,230	845	16,270
1911	4,106	142,710	1,792	44,660
1921	4,069	156,513	1,786	58,298
1926	5,558	256,027	2,597	81,508
1929	5,061	265,247	2,282	90,706
1930	5,016	229,440	2,232	82,296
1931	4,715	169,704	2,165	58,623

The average prices per ton of cottonseed received by producers in the U. S. follow:

1880	$4.00	1920	$22.95
1890	8.54	1925	30.82
1900	11.55	1930	28.75
1910	25.82	1931	21.50

For the year ended July 31, 1931, according to the Bureau of the Census cottonseed crushed totaled 4,715,148 tons; oil produced, 720,941 short tons valued at $91,638,000; cake and meal, 2,164,820 tons, $58,623,000; hulls, 1,303,504 tons, $10,474,000; linters, 823,944 bales, $8,969,000. In this particular year the value of hulls was greater than that of linters, but ordinarily that of linters is larger. Figures for 1931 do not present a fair picture of the industry, as prices were far below the level of other years. The production of cake and meal for the year ended July 31, 1931, 2,164,820 tons valued at $58,622,000, compared with 2,231,992 tons valued at $82,296,000 in 1930, and 2,281,576 tons valued at $90,706,000 in 1929. Exports for these respective years were 43,829 tons, 170,087 tons, and 286,334 tons. Those for the last six months of 1931 amounted to 149,595 tons.

Cream of Tartar — Despite the lowering of the domestic price for tartaric acid producers were holding to the price level established in January.

Cresylic Acid — Better inquiry was reported from disinfectant manufacturers but shipments into the metal refining industries were still considerably below normal.

Dextrin — Business moved in only a very routine way with buyers limiting

	Current Market	1932 Low	1932 High	1931 High	1931 Low	1930 High	1930 Low
Cellosolve (see Ethylene glycol mono ethyl ether)							
Acetate (see Ethylene glycol mono ethyl ether acetate)							
Celluloid, Scraps, Ivory cs.	lb. .13	.15	.13	.15	.13	.15	.20	.20
Shell, cases	lb. .18	.20	.18	.20	.18	.20	.20	.18
Transparent, cases	lb.	.15	.....	.15	.....	.15	.15	.15
Cellulose, Acetate, 50 lb kegs	lb. .80	1.25	.80	1.25	.80	1.25	1.25	.80
Chalk, dropped, 175 lb bbls.	lb. .03	.03½	.03	.03½	.03	.03½	.03½	.03
Precip, heavy, 560 lb cks.	lb. .02	.03½	.02	.03½	.02	.03½	.03½	.02
Light, 250 lb casks	lb. .02½	.03½	.02¼	.03½	.02½	.03½	.03½	.02½
Charcoal, Hardwood, lump, bulk wks.	bu. .18	.19	.18	.19	.18	.19	.19	.18
Willow, powd, 100 lb bbl wks.	lb. .06	.06½	.06	.06½	.06	.06½	.06½	.06
Wood, powd, 100 lb bbls.	lb. .04	.05	.04	.05	.04	.05	.05	04
Chestnut, clarified bbls wks,	lb. .01¾	.02	.01¾	.02	.01¾	.03	.03	.02½
25% tks wks	lb. .01¼	.02½	.01¾	.02½	.01¾	.02½	.02½	.01¾
Powd, 60%, 100 lb bgs wks	lb.	.04½	.....	.04¼	.....	.04½	.04½	.04½
Powd, decolorized bgs wks.	lb. .05½	.06	.05½	.06	.05½	.06	.06	.05½
China Clay, lump, blk mines	ton 8.00	9.00	8.00	9.00	8.00	9.00	9.00	8.00
Powdered, bbls	lb. .01½	.02	.01¼	.02	.01½	.02	.02	.01½
Pulverized, bbls wks	ton 10.00	12.00	10.00	12.00	10.00	12.00	12.00	10.00
Imported, lump, bulk	ton 15.00	25.00	15.00	25.00	15.00	25.00	25.00	15.00
Powdered, bbls	lb. .01½	.03	.01¼	.03	.01½	.03	.03	.01½
Chlorine								
Chlorine, cyls lo-1 wks contract	lb. .07	.08½	.07	.08½	.07	.08½	.08½	.07
cyls, cl wks,. contract	lb. .04	.04½	.04	.04½	.04	.04½	.04½	.04
Liq tank or multi-car lot cyls wks contract	lb. .01½	.02½	.01¼	.02½	.01½	.02½	.025	.01½
Chlorobenzene, Mono, 100 lb. drs lc-1 wks	lb. .10	.10½	.10	.10½	.10	.10½	.10½	.10
Chloroform, tech, 1000 lb drs.	lb. .15	.16	.15	.16	.15	.16	.16	.15
Chloropicrin, comml cyls	lb. 1.00	1.35	1.00	1.35	1.00	1.35	1.35	1.00
Chrome, Green, CP	lb. .26	.29	.26	.29	.26	.29	.29	.26
Commercial	lb. .06½	.11	.06½	.11	.06½	.11	.11	.06½
Yellow	lb. .16	.18	.16	.18	.16	.18	.18	.16
Chromium, Acetate, 8% Chrome bbls	lb. .04½	.05½	.04¼	.05¼	.04¼	.05½	.05½	.04½
20° soln, 400 lb bbls	lb.	.05½	.....	.05½	.....	.05½	.05½	.05½
Fluoride, powd, 400 lb bbl.	lb. .27	.28	.27	.28	.27	.28	.28	.27
Oxide, green, bbls	lb. .34½	.35½	.34½	.35½	.34½	.35½	.35½	.34½
Coal tar, bbls	bbl 10.00	10.50	10.00	10.50	10.00	10.50	10.50	10.00
Cobalt Oxide, black, bags	lb. 1.35	1.45	1.35	1.45	1.35	2.22	2.22	2.10
Cochineal, gray or black bag.	lb. .52	.57	.52	.57	.52	.57	1.01	.52
Teneriffe silver, bags	lb.	.57	.....	.57	.55	.57	.95	.54
Copper								
Copper, metal, electrol	100 lb.	5.75	5.75	7.25	6.25	10.36	17.78	9.50
Carbonate, 400 lb bbls	lb. .08½	.16½	.08½	.16½	.08½	.16½	.21½	.08½
Chloride, 250 lb bbls	lb. .22	.25	.22	.25	.22	.25	.28	.22
Cyanide, 100 lb drs	lb. .39	.40	.39	.40	.39	.42	.45	.41
Oxide, red, 100 lb bbls	lb. .15	.16	.15	.16	.15	.18	.32	.15½
Sub-acetate verdigris, 400 lb bbls	lb. .18	.19	.18	.19	.18	.19	.19	.18
Sulfate, bbls c-1 wks	100 lb.	2.75	2.75	3.10	3.10	4.95	5.50	3.95
Copperas, crys and sugar bulk c-1 wks	ton	14.50	.....	14.50	13.00	14.00	14.00	13.00
Cotton, Soluble, wet, 100 lb bbls	lb. .40	.42	.40	.42	.40	.42	.42	.40
Cottonseed, S. E. bulk c-1	ton	26.50	.....	26.50	.....	26.50	.....	.....
Meal S. E. bulk	ton	.....	.....	.....	.....	.....	.....	.....
7% Amm., bags mills	ton 13.25	38.00	13.25	38.00	13.25	38.00	38.00	37.50
Cream Tartar, USP, 300 lb bbls	lb. .19½	.20½	.19½	.20½	.20½	.24½	.27	.24½
Creosote, USP, 42 lb cbys	lb. .40	.42	.40	.42	.40	.42	.42	.40
Oil, Grade 1 tanks	gal. .11½	.12½	.11½	.12½	.11½	.14	.16	.15
Grade 2	gal. .10½	.11½	.10½	.11½	.10½	.12	.14	.13
Grade 3	gal. .10½	.11½	.10½	.11½	.10½	.12	.14	.13
Cresol, USP, drums	lb. .10½	.11	.10½	.11	.10½	.17	.17	.14
Crotonaldehyde, 50 gal dr.	lb. .32	.36	.32	.36	.32	.36	.36	.32
Cudbear, English	lb. .16	.17	.16	.17	.16	.17	.17	.16
Cutch, Rangoon, 100 lb bales.	lb. .10	.12	.10	.12	.10	.13	.13	.11
Borneo, Solid, 100 lb bale.	lb. .05½	.07	.05½	.07	.05½	.08½	.08½	.06½
Cyanamide, bags c-1 frt allowed Ammonia unit	.....	.97½	.....	.97½	.97½	.....	.....	.....
Dextrin, corn, 140 lb bags	100 lb. 3.59	3.67	3.59	3.67	3.47	4.02	4.82	4.42
White, 140 lb bags	100 lb. 3.27	3.37	3.27	3.37	3.37	4.02	4.77	4.17
Potato, Yellow, 220 lb bgs.	lb. .08	.09	.08	.09	.08	.09	.09	.08
White, 220 lb bags lc-1	lh. .08	.09	.08	.09	.08	.09	.09	.08
Tapioca, 200 lb bags lc-1	lb. .08½	.08¾	.08¼	.08¾	.08½	.08¾	.08½	.08
Diamylphthalate, drs wks	gal.	3.80	.....	3.80	.....	3.80	3.80	3.80
Dianisidine, barrels	lb. 2.35	2.70	2.35	2.70	2.35	2.70	2.70	2.35
Dibutylphthalate, wks	lb. .228	.23	.228	.23	.228	.28	.28	.24½
Dibutyltartrate, 50 gal drs.	lb. .29½	.31½	.29½	.31½	.29½	.31½	.31½	.29½
Dichloroethylether, 50 gal drs	lb.	.06	.....	.06	.....	.06	.07	.05
Dichloromethane, drs wks	lb. .55	.65	.55	.65	.55	.65	.65	.55
Diethylamine, 400 lb drs	lb. 2.75	3.00	2.75	3.00	2.75	3.00	3.00	2.75
Diethylcarbonate, drs	gal. 1.85	1.90	1.85	1.90	1.85	1.90	1.90	1.85
Diethylaniline, 850 lb drs	lb. .55	.60	.55	.60	.55	.60	.60	.55
Diethyleneglycol, drs	lb. .14	.16	.14	.16	.14	.16	.13	.10
Mono ethyl ether, drs	lb. .15	.16	.15	.16	.15	.16	.16	.13
Mono butyl ether, drs	lb. .24	.30	.24	.30	.24	.30	.30	.24
Diethylene oxide, 50 gal dr.	lb.	.50	.....	.50	.....	.50	.50	.50
Diethylorthotoluidin, drs	lb. .64	.67	.64	.67	.64	.67	.67	.64
Diethyl phthalate, 1000 lb drums	lb. .23	.26	.23	.26	.23	.26	.26	.24
Diethylsulfate, technical, 50 gal drums	lb. .30	.35	.30	.35	.30	.35	.35	.30
Dimethylamine, 400 lb drs	lb.	2.62	.....	2.62	.....	2.62	2.62	2.62
Dimethylaniline, 340 lb drs	lb. .25	.27	.25	.27	.25	.28	.28	.26

Industrial Chemicals

including

Acids Alums
Aluminas--Hydrate and Calcined
Ammonium Persulphate
Bleaching Powder
Caustic Soda
Chlorine--Liquid
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Vast hardwood forests covering many square miles in parts of two states ... a distillation plant laid out to consume 200 cords of wood per day ... constant supplies of natural gas and artesian water on our own properties ... prestige achieved through 50 years' operation as one of the South's largest lumber producers ... financial scope and stability built up through capable, conservative management ... *These* are the basic factors in Crossett's unique advantages in achieving mass production in the distillation of Methanol and Acetic Acid, and the making of charcoal.

Correspondence invited

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1931 Average $1.404 - Jan. 1931 $1.283 - Feb. 1932 $1.57

purchasing to relatively small quantities. No price change occurred.

Dried Blood — Competition between producers forced quotations down to $1.60-$1.65 with buyers only taking quantaties for immediate needs. Total production of nitrogen during the year ended June 30, 1931, is estimated by Chemical Division of the Department of Commerce at 1,694,288 metric tons, a decrease of about 23% from the previous fiscal year. Total consumption also fell 329,492 tons or 17%. According to the Chemical Division, the present world nitrogen producing capacity is 3,000,000 metric tons, exclusive of Chilean.

Dyes — Some improvement in the demand was reported from both the textile and the tanning industries but buyers were holding commitments to orders of modest proportions. Prices were held rather firmly however. Imports of synthetic dyes during the month of January totaled 298,267 pounds and had an invoice value of $260,478, it is reported by the Department of Commerce and the United States Tariff Commission. These totals compare with 181,775 pounds valued at $159,482, imported in January, 1931. Details respecting imports in January, this year, follow:

	Percentages	
	Jan. 1932	*Jan. 1931*
Germany	74.99	86.46
Switzerland	23.07	11.88
England	1.79	1.66
All other	.15	....
	Pounds	*Invoice Value*
New York	292,021	$252,104
Boston	1,148	4,575
Newark	698	1,477
Philadelphia	400	2,322

Leading Dyes

	Pounds
Vat golden yellow GK dbl. paste (single strength)	38,900
Vat blue green FFB dbl. paste (single strength)	16,880
Vat printing black B paste	9,350
Vat khaki GG paste, GG pdr. (single strength)	7,800
Brilliant indigo 4B	6,228

Imports of synthetic aromatic chemicals in January, this year, amounted to 2,410 pounds, valued at $2,851. In January, 1931, the total was 3,378 pounds, valued at $5,838. Imports of coal tar intermediates, medicinals, photographic developers, and other products in January, 1932, totaled 37, 621 pounds, valued at $25,481. In January, 1931, they were 175,594 pounds, valued at $41,995. Imports of color lakes were 1,090 pounds in January, this year, against 25 pounds in January, 1931.

Fertilizers — It is quite evident that fertilizer mixers are preparing for a restricted demand this season by holding production down to very low figures. This should prevent prices from becoming demoralized and to date they have held

	Current Market		1932 Low	1932 High	1931 High	1931 Low	1930 High	1930 Low
Dimethylsulfate, 100 lb drs...lb.	.45	.50	.45	.50	.45	.50	.50	.45
Dinitrobenzene, 400 lb bbls...lb.	.15	.16	.15	.16	.15	.16½	.16½	.15½
Dintrochlorobenzene, 400 lb bbls.....lb.	.13	.15	.13	.15	.13	.15	.15	.13
Dinitronaphthalene, 350 lb bbls .....lb.	.34	.37	.34	.37	.34	.37	.37	.34
Dinitrophenol, 350 lb bbls....lb.	.23	.24	.23	.24	.29	.30	.32	.31
Dinitrotoluene, 300 lb bbls...lb.	.16	.17	.16	.17	.16	.17	.18	.16
Diorthotolyguanidine, 275 lb bbls wks.....lb.	.42	.46	.42	.46	.42	.46	.46	.42
Dioxan (See Diethylene Oxide)	.....	.....	.....	.....	.....	.....	.....	.....
Diphenyl.....lb.	.20	.40	.20	.40	.20	.40	.50	.20
Diphenylamine.....lb.	.34	.37	.34	.37	.37	.38	.40	.38
Diphenylguanidine, 100 lb bbl lb.	.30	.35	.30	.35	.30	.35	.35	.30
Dip Oil, 25%, drums.....lb.	.26	.30	.26	.30	.26	.30	.30	.26
Divi Divi pods, bgs shipmt..ton	29.00	30.00	29.00	30.00	28.00	35.00	46.50	35.00
Extract.....lb.	.05	.05½	.05	.05½	.05	.05½	.05½	.05
Egg Yolk, 200 lb cases.....lb.	.51	.52	.51	.52	.45	.58	.80	.72
Epsom Salt, tech, 300 lb bbls c-l NY.....100 lb.	1.70	1.90	1.70	1.90	1.70	1.90	1.90	1.70
Ether, USP anaesthesia 55 lb. drs. .....lb.	.....	.23	.....	.23	.23	.28	.28	.21
USP (Conc.).....lb.	.09	.10	.09	.10	.09	.10	.....	.....
Ethyl Acetate, 85% Ester, ... tanks.....lb.	.....	.09	.....	.09	.06½	.09	.115	.085
drums.....lb.	.....	.10	.....	.10	.08	.10	.158	.094
Anhydrous, tanks.....lb.	.....	.10	.....	.10	.075	.119	.142	.119
drums.....lb.	.....	.10½	.....	.10½	.085	.121	.156	.115
Acetoacetate, 50 gal drs....lb.	.65	.68	.65	.68	.65	.68	.68	.65
Benzylaniline, 300 lb drs...lb.	.88	.90	.88	.90	.88	.90	1.11	.88
Bromide, tech, drums .....lb.	.50	.55	.50	.55	.50	.55	.55	.50
Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.85	1.90	1.85	1.90	1.90	1.85
Chloride, 200 lb. drums....lb.	.....	.22	.....	.22	.....	.22	.22	.22
Chlorocarbonate, cbys.....lb.	.....	.30	.....	.30	.....	.30	.40	.30
Ether, Absolute, 50 gal drs..lb.	.50	.52	.50	.52	.50	.52	.52	.50
Furoate, 1 lb tins .....lb.	.....	5.00	.....	5.00	.....	5.00	5.00	5.00
Lactate, drums works.....lb.	.25	.29	.25	.29	.25	.29	.29	.25
Methyl Ketone, 50 gal drs..lb.	.....	.30	.....	.30	.....	.30	.30	.30
Oxalate, drums works.....lb.	.45	.55	.45	.55	.45	.55	.55	.45
Oxybutyrate, 50 gal drs wks.lb.	.....	.30½	.....	.30½	.....	.30½	.30½	.30½
Ethylene Dibromide, 60 lb dr .lb.	.....	.70	.....	.70	.....	.70	.70	.70
Chlorhydrin, 40%, 10 gal cbys. chloro. cont.....lb.	.75	.85	.75	.85	.75	.85	.85	.75
Dichloride, 50 gal drums...lb.	.05	.07	.05	.07	.05	.07	.07	.05
Glycol, 50 gal drs wks.....lb.	.25	.28	.25	.28	.25	.28	.28	.25
Mono Butyl Ether drs wks.	.....	.24	.....	.24	.24	.27	.27	.23
Mono Ethyl Ether drs wks	.17	.20	.17	.20	.17	.20	.20	.16
Mono Ethyl Ether Acetate dr. wks.....	.19½	.23	.19½	.23	.19½	.23	.23	.19
Mono Methyl Ether, drs.lb.	.21	.23	.21	.23	.21	.23	.23	.19
Stearate.....	.18	.18	.18	.18	.18	.18	.....	.....
Oxide, cyl.....lb.	.....	2.00	.....	2.00	.....	2.00	2.00	2.00
Ethylidenaniline.....lb.	.45	.47½	.45	.47½	.45	.47½	.47½	.45
Feldspar, bulk.....ton	15.00	20.00	15.00	20.00	15.00	20.00	25.00	15.00
Powdered, bulk works.....ton	15.00	21.00	15.00	21.00	15.00	21.00	21.00	15.00
Ferric Chloride, tech, crystal 475 lb bbls.....lb.	.05	.07½	.05	.07½	.05	.07½	.07½	.05
Fish Scrap, dried, wks.....unit	.....	3.00&10	.....	3.00&10	3.00&10	4.25&10	4.35&10	3.90&10
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit	.....	2.40&50	.....	2.40&50	.....	2.40&50	3.50&50	3.20&50
Fluorspar, 98%, bags.....	41.00	46.00	41.00	46.00	41.00	46.00	46.00	41.00
Formaldehyde								
Formaldehyde, aniline, 100 lb. drums.....lb.	.37½	.42	.37½	.42	.37½	.42	.42	.37½
USP, 400 lb bbls wks.....lb.	.06	.07¼	.06	.07¾	.06	.07¼	.08	.06
Fossil Flour.....lb.	.02½	.04	.02½	.04	.02½	.04	.04	.02½
Fullers Earth, bulk, mines..ton	15.00	20.00	15.00	20.00	15.00	20.00	20.00	15.00
Imp. powd c-l bags.....ton	24.00	30.00	24.00	30.00	24.00	30.00	30.00	24.00
Furfural (tech.) drums, wks..lb.	.....	.10	.....	.10	.....	.10	.15	.10
Furfuramide (tech) 100 lb dr..lb.	.....	.30	.....	.30	.....	.30	.30	.30
Furfuryl Acetate, 1 lb tins....lb.	.....	5.00	.....	5.00	.....	5.00	5.00	5.00
Alcohol, (tech) 100 lb dr....lb.	.....	.50	.....	.50	.....	.50	.50	.50
Furoic Acid (tech) 100 lb dr...lb.	.....	.50	.....	.50	.....	.50	.50	.50
Fusel Oil, 10% impurities ...gal.	.....	1.35	.....	1.35	.....	1.35	1.35	1.35
Fustic, chips.....lb.	.04	.05	.04	.05	.04	.05	.05	.04
Crystals, 100 lb boxes.....lb.	.18	.20	.18	.20	.18	.22	.22	.20
Liquid, 50°, 600 lb bbls....lb.	.07	.08	.07	.08	.07	.10	.10	.09
Solid, 50 lb boxes.....lb.	.14	.16	.14	.16	.14	.16	.16	.14
Sticks.....ton	25.00	26.00	25.00	26.00	25.00	26.00	26.00	25.00
G Salt paste, 360 lb bbls.....lb.	.45	.50	.45	.50	.45	.50	.50	.45
Gall Extract.....lb.	.18	.20	.18	.20	.18	.20	.20	.18
Gambier, common 200 lb cs...lb.	.....	.07	.....	.07	.06½	.07	.07	.06
25% liquid, 450 lb bbls....lb.	.08	.10	.08	.10	.08	.10	.10	.08
Singapore cubes, 150 lb bg..lb.	.09½	.09	.09½	.09	.09½	.09	.09	.08½
Gelatin, tech, 100 lb cases....lb.	.45	.50	.45	.50	.45	.50	.50	.45
Glauber s Salt, tech, c-l wks.....100 lb.	1.00	1.70	1.00	1.70	1.00	1.70	1.70	1.00
Glucose (grape sugar) dry 70-80° bags c-l NY.....100 lb.	3.24	3.34	3.24	3.34	3.24	3.34	3.34	3.24
Tanner's Special, 100 lb bags .....100 lb.	.....	3.14	.....	3.14	.....	3.14	3.14	3.14
Glue, medium white, bbls ...lb.	.16	.20	.16	.20	.16	.24	.24	.20
Pure white, bbls.....lb.	.20	.25	.20	.25	.20	.26	.26	.22
Glycerin, CP, 550 lb drs.....lb.	.11½	.11½	.11¼	.11½	.11¼	.14½	.14½	.12½
Dynamite, 100 lb drs.....lb.	.09	.09½	.09	.09½	.09	.12½	.12½	.11
Saponification, tanks.....lb.	.06	.06½	.06	.06½	.06	.07½	.08	.07½
Soap Lye, tanks.....lb.	.04½	.04¾	.04½	.05	.04¾	.07	.07½	.06¾
Graphite, crude, 220 lb bgs...ton	15.00	35.00	15.00	35.00	15.00	35.00	35.00	15.00
Flake, 500 lb bbls.....lb.	.06	09	.06	.09	.06	.09	.09	.06
Gums								
Gum Accroides, Red, coarse and fine 140-150 lb bags.....lb.	.03¾	.04½	.03¾	.04½	.03¾	.04½	.04½	.03¾
Powd, 150 lb bags.....lb.	.06	.06½	.06	.06½	.06	.06½	.06½	.06

How Many Do You Know?

More than six hundred (count them!) men of the chemical and drug industries gathered at the Big Dinner last March 12th. We are ordering dinner and trimmings for one thousand for the dinner March 15th, 1932. Come and get acquainted.

Seventh Annual Dinner of the Drug, Chemical and Allied Trades: Hotel Commodore, Tuesday Evening, March fifteenth, Nineteen thirty-two: Reception at six-thirty.

DRUG, CHEMICAL AND ALLIED TRADES SECTION
NEW YORK BOARD OF TRADE, INC.

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1931 Average $1.404 - Jan. 1931 $1.283 - Feb. 1932 $1.57

surprisingly well. Secretary Hester of the New Orleans Cotton Exchange reports that sales of fertilizer, as indicated by tag sales, in the seven months ended Feb. 29 in 10 cotton growing states, totaled 473,-351 tons, against 972,080 tons in a similar period last season, 1,571,743 two seasons ago, and 1,224,319 three seasons ago. Hester's figures by states covering fertilizer tags sold in the South, as officially reported by agricultural bureaus and state boards, for seven-month periods ended February 29, in tons, follow:

	1932	*1931*	*1930*
Georgia	58,086	177,788	342,265
North Carolina	160,644	268,657	336,769
South Carolina	108,347	118,330	191,749
Alabama	33,800	77,600	176,150
Mississippi	19,983	167,500	260,000
Arkansas	7,650	19,639	53,300
Louisiana	32,510	53,963	101,833
Tennessee	21,007	38,263	41,532
Texas	24,980	47,580	61,945
Oklahoma	6,144	2,760	6,200
Total	473,151	972,080	1,571,743

Glycerin — With stocks accumulating and the demand for anti-freeze purposes very small due to the mildness of the weather in most parts of the country prices were weak in practically all grades. Soap lye quotations were openly reduced ⅛c. U. S. production and trade in glycerin during comparable nine months periods is shown in the following table:

	1930	
	Pounds	*Value*
Import (general)		
Refined	3,177,479	$272,494
Crude	10,906,426	633,373
Exports	607,690	102,892
Production:		
Crude, 80% basis	138,647,379	.....
Dynamite glycerin	50,377,057	.....
Chemically pure	69,654,223	.....
Stocks—December 31		
Crude 80% basis	12,793,160	.....
Dynamite glycerin	9,160,185	.....
Chemically pure	6,829,504	.....
	1931	
	Pounds	*Value*
Import (general)		
Refined	1,975,970	$141,595
Crude	9,951,473	514,606
Exports	328,143	48,095
Production:		
Crude, 80% basis	138,847,219	.....
Dynamite glycerin	43,365,948	.....
Chemically pure	70,527,961	.....
Stocks—December 31		
Crude 80% basis	15,368,286	.....
Dynamite glycerin	11,749,900	.....
Chemically pure	11,177,720	.....

Gums — Conditions were quiet in the gum market during the past month with buyers restricting purchases and importers unwilling to make only very slight concessions. The various grades of tragacanth were off 5c in the last week of the month. Production and exports of the four most important natural gums of Siam, sticklac, gum dammar, gum benjamin, and gamboge declined sharply during the first six months of 1931. Great reductions in prices offered for the gums were not considered sufficient to make the gathering and forwarding of products to market attractive. Shipments of sticklac for the first half of 1931 aggregated 9,956 piculs (a picul equals 133⅓ pounds)

	Current Market		1932 Low	1932 High	1931 High	1931 Low	1930 High	1930 Low
Yellow, 150-200 lb bags	lb.	.18	.18	.20	.18	.20	.20	.18
Animi (Zanzibar) bean & pea 250 lb cases	lb.	.35	.35	.40	.35	.40	.40	.35
Glassy, 250 lb cases	lb.	.50	.50	.55	.50	.55	.55	.50
Asphaltum, Barbadoes (Manjak) 200 lb bags	lb.	.04½	.04½	.06	.04½	.12	.12	.09
Egyptian, 200 lb cases	lb.	.13	.13	.15	.13	.17	.17	.15
Gilsonite Selects, 200 lb bags	ton	30.50	30.50	32.90	30.50	32.90	32.90	30.50
Damar Batavia standard 136, lb cases	lb.	.08½	.08½	.09	.08½	.13	.20	.14
Batavia Dust, 160 lb bags	lb.	.05	.05½	.05	.05½	.05½	.06	.11	.06
E Seeds, 136 lb cases	lb.	.06	.06½	.06	.06½	.07	.08	.13	.08
F Splinters, 136 lb cases and bags	lb.	.05½	.06	.05½	.06	.06½	.07½	.13½	.07
Singapore, No 1, 224 lb cases	lb.	.10½	.11	.10½	.11	.10½	.15	.24	.18½
No. 2, 224 lb cases	lb.	.07	.07½	.07	.07½	.07	.10	.20½	.13
No. 3, 180 lb bags	lb.	.04½	.05	.04½	.05	.05	.06	.11½	.07
Benzoin Sumatra, U. S. P. 120 lb cases	lb.	.21	.22	.21	.22	.23	.34	.40	.33
Copal Congo, 112 lb bags, clean opaque	lb.	.16½	.17	.16½	.17	.16	.17	.17	.16
Dark, amber	lb.	.06	.07	.06	.07	.06½	.07½	.08	.07½
Light, amber	lb.	.08½	.09	.08	.09	.08	.14	.14	.12½
Water white	lb.	.37	.45	.37	.45	.37	.45	.45	.37
Mastic	lb.	.42	.44	.42	.44	.42	.58	.65	.57
Manila, 180-190 lb baskets									
Loba A	lb.	.10	.11	.10	.11	.11	.13	.17½	.13
Loba B	lb.	.08	.08½	.08	.08½	.09	.10½	.16½	.13½
Loba C	lb.	.07½	.08	.07½	.08	.08½	.10	.14	.10
M A Sorts	lb.	.04½	.05	.04½	.05	.04½	.06½	.....	.....
D B B Chips	lb.	.05½	.06½	.05½	.06½	.05½	.08	.....	.....
East Indies chips, 180 lb bags	lb.	.05	.05½	.05	.05½	.05	.05½	.11	.09
Pale bold, 224 lb cs	lb.	.15½	.16	.15½	.16	.15½	.16	.21	.17½
Pale nubs, 180 lb bags	lb.	.08	.08½	.08	.08½	.08	.09	.16	.12½
Pontianak, 224 lb cases									
Bold gen No 1	lb.	.15½	.16	.15½	.16	.16	.17	.21	.19
Gen chips spot	lb.	.07	.08	.07	.08	.07	.08½	.15	.13½
Elemi, No. 1, 80-85 lb cs	lb.	.09	.09½	.09	.09½	.10	.12	.14	.12½
No. 2, 80-85 lb cases	lb.	.08½	.09	.08½	.09	.09½	.11½	.13½	.12
No. 3, 80-85 lb cases	lb.	.08	.08½	.08	.08½	.08½	.11	.13	.11
Kauri, 224-226 lb cases No. 1		.43	.46	.43	.46	.42	.50	.57	.48
No. 2 fair pale	lb.	.28	.30	.28	.30	.24	.29	.38	.32
Brown Chips, 224-226 lb cases	lb.	.10	.12	.10	.12	.10	.12	.12	.10
Bush Chips, 224-226 lb cases	lb.	.26	.28	.26	.28	.28	.34	.40	.38
Pale Chips, 224-226 lb cases	lb.	.19	.21	.19	.21	.19	.22	.26	.24½
Sandarac, prime quality, 200 lb bags & 300 lb casks	lb.	.....	.20	.....	.20	.18	.22	.40	.27
Helium, 1 lit. bot.	lit.	.....	25.00	.....	25.00	.....	25.00	25.00	25.00
Hematine crystals, 400 lb bbls	lb.	.14	.18	.14	.18	.14	.18	.18	.14
Paste, 500 bbls	lb.	.....	.11	.....	.11	.....	.11	.11	.11
Hemlock 25%, 600 lb bbls wks	lb.	.03	.03½	.03	.03½	.03	.03½	.03½	.03
Bark	ton	.....	16.00	.....	16.00	.....	16.00	16.00	16.00
Hexalene, 50 gal drs wks	lb.	.40	.50	.40	.50	.40	.60	.60	.60
Hexamethylenetetramine, drs	lb.	.46	.47	.46	.47	.46	.50	.50	.46
Hoof Meal, fob Chicago	unit	.....	1.35	.....	1.35	1.35	2.50	3.75	2.50
South Amer. to arrive	unit	.....	1.80	.....	1.80	1.80	2.70	3.75	2.70
Hydrogen Peroxide, 100 vol, 140 lb cbys	lb.	.21	.24	.21	.24	.21	.24	.26	.21
Hydroxyamine Hydrochloride	lb.	.....	3.15	.....	3.15	.....	3.15	3.15	3.15
Hypernic, 51°, 600 lb bbls	lb.	.11	.12	.11	.12	.11	.15	.15	.12
Indigo Madras, bbls	lb.	1.25	1.30	1.25	1.30	1.25	1.30	1.30	1.28
20% paste, drums	lb.	.15	.18	.15	.18	.15	.18	.18	.15
Synthetic, liquid	lb.	.....	.12	.....	.12	.....	.12	.12	.12
Iron Chloride, see Ferric or Ferrous									
Iron Nitrate, kegs	lb.	.09	.10	.09	.10	.09	.10	.10	.09
Coml, bbls	100 lb.	2.50	3.25	2.50	3.25	2.50	3.25	3.25	2.50
Oxide, English	lb.	.10	.12	.10	.12	.10	.12	.12	.10
Red, Spanish	lb.	.02½	.03½	.02¼	.03¼	.02½	.03½	.03½	.02½
Isopropyl Acetate, 50 gal drs	gal.	.85	.90	.85	.90	.85	.90	.90	.85
Japan Wax, 224 lb cases	lb.	.08	.08½	.08	.09	.07½	.11	.15½	.11½
Kieselguhr, 95 lb bgs NY									
Brown	ton	60.00	70.00	60.00	70.00	60.00	70.00	70.00	60.00
Lead Acetate, bbls wks	100 lb.	9.00	9.50	9.00	10.00	9.50	11.00	13.50	10.50
White crystals, 500 lb bbls wks	100 lb.	10.00	10.50	10.00	11.00	10.50	12.25	14.50	11.50
Arsenate, drs 1c-1 wks	lb.	.10	.13	.10	.13	.10	.14	.16	.13
Dithiofuroate, 100 lb dr	lb.	.....	1.00	.....	1.00	.....	1.00	1.00	1.00
Metal, c-1 NY	100 lb.	.....	3.25	3.25	3.75	3.75	4.60	7.75	5.10
Nitrate, 500 lb bbls wks	lb.	.12	.14	.12	.14	.12	.14	.14	.13
Oleate, bbls	lb.	.17½	.18	.17½	.18	.17½	.18	.18	.17½
Oxide Litharge, 500 lb bbls	lb.	.06½	.07	.06½	.07	.06½	.08	.08½	.08½
Red, 500 lb bbls wks	lb.	.06½	.07	.06½	.07	.06½	.08½	.09½	.08½
White, 500 lb bbls wks	lb.	.06½	.07	.06½	.07	.06½	.08	.09½	.07½
Sulfate, 500 lb bbls wk	lb.	.05½	.06	.05½	.06	.05½	.07	.08½	.06½
Leuna saltpetre, bags c.i.f.	ton	.....	Nom.	.....	Nom.	.....	57.60	57.60	57.60
S. points c. i. f.	ton	.....	Nom.	.....	Nom.	.....	57.90	57.90	57.90
Lime, ground stone bags	ton	.....	4.50	.....	4.50	.....	4.50	4.50	4.50
Live, 325 lb bbls wks	100 lb.	.....	1.05	.....	1.05	.....	1.05	1.05	1.05
Lime Salts, see Calcium Salts									
Lime-Sulfur soln bbls	gal.	.15	.17	.15	.17	.15	.17	.17	.15
Lithopone, 400 lb bbls 1c-1 wks	lb.	.04½	.05	.04½	.05	.04½	.05	.05½	.04½
Logwood, 51°, 600 lb bbls	lb.	.07	.08	.07	.08	.07	.08	.08½	.07
Chips, 150 lb bags	lb.	.03	.03½	.03	.03½	.03	.03½	.03½	.03
Solid, 50 lb boxes	lb.	.12	.12½	.12	.12½	.12	.12½	.12½	.12½
Sticks	ton	24.00	26.00	24.00	26.00	24.00	26.00	26.00	24.00
Lower grades	lb.	.07½	.08	.07½	.08	.07½	.08	.08	.07½
Madder, Dutch	lb.	.22	.25	.22	.25	.22	.25	.25	.22
Magnesite, calc, 500 lb bbl	ton	50.00	60.00	50.00	60.00	50.00	60.00	60.00	50.00

Methanol

(NATURAL)

All Grades Including
Pure Methanol
97% Methanol
95% Methanol
Denaturing Grade Methanol

●

Methyl Acetone

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Monohydrate of Soda

Standard Quality

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1931 Average $1.404 - Jan. 1931 $1.283 - Feb. 1932 $1.57

valued at 221,931 baht (1 baht equals 44c in United States currency), whereas the average quantity for the previous five years was over 46,000 piculs. Exports of gum dammar for the six months' period dropped to 470 piculs, valued at 7,550 baht, which compares with the five-year average of 14,000 piculs.

Lead Acetate — Because of the extremely weak position of the metal which touched a new low the various grades of the acetate salt were reduced 50c.

Mercury — The metal was in better demand and the price strengthened.

Methanol — The reaction in alcohol prices was reflected in the situation in methanol and all talk of a rise in prices was abandoned. Exports of methanol last year dropped more than 50 per cent in value, totaling 582,925, gallons valued at $240,659, against 951,938 gallons, valued at $482,717 in 1930, according to figures just compiled by the chemical division of the Department of Commerce. The year's total, however, was greater in quantity than that of 1929, when exports were 498,481 gallons, valued at $403,475, it was stated. The figures show the great fluctuation in markets for methanol, Japan being the heaviest importer of the American product last year, passing Russia, United Kingdom and France, which, in 1930, were the three heaviest consumers. Shipments to Japan, it was announced, increased from 98,355 gallons in 1930 to 178,019 last year, while Russia, which in 1930 took 244,217 gallons, had no imports, and shipments to the United Kingdom dropped from 235,200 gallons to 81,526 gallons, and to France from 181,295 gallons to 88,149 gallons. Slackness in world conditions is blamed.

Naval Stores — Prices of all but one or two grades of rosin showed much firmer tendencies during February and turpentine prices also made substantial gains. The situation in the naval stores industry appeared to be much better although the industry is far from being out of the woods yet. Production has been curtailed and the outlook for the next naval stores year is much more encouraging. Total naval stores, gum and resin exports during January amounted to $1,009,130, compared with $1,238,888 during the same month last year. Such business during the last half of 1931 totaled $7,733,000 compared with $11,059,000 during the corresponding period of 1930. Gum rosin exports provided the only favorable feature of the January export trade in naval stores, amounting to 107,568 barrels, valued at $622,300, compared

	Current Market	1932 Low	1932 High	1931 High	1931 Low	1930 High	1930 Low
Magnesium							
Magnesium Carb, tech, 70 lb bags NY lb.	06	06½	.06	.06½	.06	.06½	.06½ .06
Chloride flake, 375 lb. drs c-l wks ton	35.00	36.00	35.00	36.00	35.00	36.00	36.00 36.00
Imported shipment ton	31.75	33.00	31.75	33.00	31.75	33.00	33.00 31.75
Fused, imp, 900 lb bbls NY ton	.....	31.00	.....	31.00	.....	31.00	31.00 31.00
Fluosilicate, crys, 400 lb bbls wks lb.	.10	.10½	.10	.10½	.10	.10½	.10½ .10
Oxide, USP, light, 100 lb bbls lb.	.....	.42	.....	.42	.....	.42	.42 .42
Heavy, 250 lb bbls lb.	.. ..	.50	.....	.50	.....	.50	.50 .50
Peroxide, 100 lb cs lb.	1.00	1.25	1.00	1.25	1.00	1.25	1.25 1.00
Silicofluoride, bbls lb.	.09½	.10½	.09¾	.10¼	.09½	.10½	.10½ .09½
Stearate, bbls lb.	.24	.26	.24	.26	.24	.26	.26 .25
Manganese Borate, 30%, 200 lb bbls lb.	.....	.19	.....	.19	.....	.19	.19 .19
Chloride, 600 lb casks lb.	.07½	.08½	.07½	.08½	.07½	.08½	.08½ .07½
Dioxide, tech (peroxide) drs lb.	.03½	.06	.03½	.06	.03½	.06	.06 .03½
Ore, Powdered or granular..							
75-80%, bbls lb.	.02½	.03	.02½	.03	.02½	.03	.03 .02½
80-85%, bbls lb.	.....	.03½	.....	.03½	.....	.03½	.03½ .03½
85-88%, bbls lb.	.04	.04½	.04	.04½	.04	.04½	.04½ .04
Sulfate, 550 lb drs NY lb.	.07	.08	.07	.08	.07	.08	.08 .07
Mangrove 55%, 400 lb bbls.. lb.	.....	.04	.....	.04	.03½	.04	Nom. .03½
Bark, African ton	24.00	25.00	24.00	25.00	23.00	29.75	33.00 29.75
Marble Flour, bulk ton	14.00	15.00	14.00	15.00	14.00	15.00	15.00 14.00
Mercurous chloride lb.	.....	.93	.....	.93	.93	2.05	2.05 2.05
Mercury metal 76 lb flask	67.00	67.50	65.00	68.00	64.00	106.00	124.50 106.00
Meta-nitro-aniline lb.	.67	.69	.67	.69	.67	.69	.69 .67
Meta-nitro-para-toluidine 200 lb. bbls lb.	1.40	1.55	1.40	1.55	1.40	1.55	1.55 1.50
Meta-phenylene-diamine 300 lb. bbls lb.	.80	.84	.80	.84	.80	.84	.84 .80
Meta-toluene-diamine, 300 lb bbls lb.	.67	.69	.67	.69	.67	.69	69 .67
Methanol							
Methanol, (Wood Alcohol),....							
95% gal.	.33	.35	.33	.35	.33	.37	.48 .35
97% gal.	.34	.39	.34	.39	.34	.43	.49 .39
Pure, Synthetic drums cars gal.	.39½	.41½	.39½	.41½	.39½	.42½	.50 .42½
Synthetic tanks gal.	.....	.35½	.....	.35½	.35½	.40½	.50 .40½
Methyl Acetate, drums gal.	.. ..	Nom.	.....	Nom.	.....	Nom.	Nom. Nom.
Acetone, gal.	.50	.55	.50	.55	50	.70	.77 .65
Anthraquinone, lb.	.85	.95	.85	.95	.85	.95	.85 .70
Cellosolve, (See Ethylene Glycol Mono Methyl Ether)	.....	.....	.....	.....	.....	.....	....
Chloride, 90 lb cyl lb.	.45	.45	.45	.45	.45	.45	.45 .45
Furoate, tech., 50 gal. dr., lb.	.....	50	.....	.50	.....	.50	.50 .50
Mica, dry grd. bags wks lb.	65.00	80.00	65.00	80.00	65.00	80.00	80.00 65.00
Wet, ground, bags wks lb.	110.00	115.00	110.00	115.00	110.00	115.00	115.00 110.00
Michler's Ketone, kegs lb.	.....	3.00	.....	3.00	.....	3.00	3.00 3.00
Monochlorobenzene, drums see, Chorobenzene, mono lb.							
Monomethylparaminosufate 100 lb drums lb.	3.75	4.00	3.75	4.00	3.75	4.00	4.00 3.75
Montan Wax, crude, bags lb.	.05½	.07	.05½	.07	.05½	.07	.07 .06
Myrobalans 25%, liq bbls b	.03½	.04½	.03½	.04½	.03½	.04½	.04½ .03½
50% Solid, 50 lb boxes lb.	.05	.05½	.05	.05½	.05	.05½	.05½ .05
J1 bags ton	34.00	35.00	34.00	35.00	34.00	35.00	41.00 34.00
J 2 bags ton	15.25	15.50	15.25	15.50	15.50	22.50	26.50 19.75
R 2 bags ton	14.75	15.00	14.75	15.00	16.00	20.00	27.50 19.00
Naphtha, v. m. & p. (deodorized) bbls gal.	.12	.14	.12	.14	.12	.18	.16 .16
Naphthalene balls, 250 lb bbls wks lb.	.03¾	.04¼	.03¾	.04¼	.03¾	.04¼	.05½ .03¾
Crushed, chipped bgs wks. lb.	.....	.04	.....	.04	.....	.04	.04½ .04
Flakes, 175 lb bbls wks lb.	.....	.03¾	.....	.03¾	.....	.03¾	.05 .03¾
Nickel Chloride, bbls kegs lb.	.18	.20	.18	.20	.18	.21	.21 .20
Oxide, 100 lb kegs NY lb.	.37	.40	.37	.40	.37	.40	.40 .37
Salt bbl. 400 bbls lb NY lb.	.10½	.13	.10½	.13	.10½	.13	.13 .10½
Single, 400 lb bbls NY lb.	.10½	.12	.10½	.12	.10½	.12	.13 .10½
Metal ingot lb.	.35	.35	.35	.35	.35	.....	....
Nicotine, free 40%, 8 lb tins, cases lb.	1.25	1.30	1.25	1.30	1.25	1.30	1.30 1.25
Sulfate, 10 lb tins lb.	.98½	1.20	.98½	1.20	.98½	1.20	1.20 .98½
Nitre Cake, bulk ton	11.00	12.00	11.00	12.00	12.00	14.00	18.00 12.00
Nitrobenzene, redistilled, 1000 lb drs wks lb.	.09	.09½	.09	.09½	.09	.09½	.09½ .09
Nitrocellulose, c-l-l-cl, wks. lb.	.25	.36	.25	.36	.25	.36	.36 .25
Nitrogenous Material, bulk. unit	1.50	1.55	1.50	1.55	1.50	2.70	3.40 2.50
Nitronaphthalene, 550 lb bbls lb.	.....	.25	.....	.25	.....	.25	.25 .25
Nitrotoluene, 1000 lb drs wks lb.	.14	.15	.14	.15	.14	.15	.15 .14
Nutgalls Aleppy, bags lb.	.....	.18	.....	.18	.16	.18	.16½ .16
Chinese, bags lb.	.17	.18	.17	.18	.17	.18	.13 .12
Oak Bark, ground ton	30.00	35.00	30.00	35.00	30.00	35.00	35.00 30.00
Whole ton	20.00	23.00	20.00	23.00	20.00	23.00	23.00 20.00
Orange-Mineral, 1100 lb casks NY lb.	.10½	.13	.10½	.13	.10½	.13	.13 .11¼
Orthoaminophenol, 50 lb kgs. lb.	2.15	2.25	2.15	2.25	2.15	2.25	2.25 2.15
Orthoanisidine, 100 lb drs lb.	2.50	2.60	2.50	2.60	2.50	2.60	2.60 2.50
Orthochlorophenol, drums lb.	.50	.65	.50	.65	.50	.65	.65 .50
Orthocresol, drums lb.	.18	.22	.18	.22	.18	.25	.35 .18
Orthodichlorobenzene, 1000 lb drums lb.	.07	.10	.07	.10	.07	.10	.10 .07
Orthonitrochlorobenzene, 1200 lb drs wks lb.	.28	.29	.28	.29	.28	.33	.33 .30
Orthonitrotoluene, 1000 lb drs wk lb.	.16	.18	.16	.18	.16	.18	.18 .16
Orthonitrophenol, 350 lb dr. lb.	.85	.90	.85	.90	.85	.90	90 .85
Orthotoluidine, 350 lb bbl 1c-1 lb.	.20	.22	.20	.22	.25	.30	.30 .25

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1931 Average $1.404 - Jan. 1931 $1.283 - Feb. 1932 $1.57

with 61,560 barrels exported during January, 1931, which were valued at $514,727. Gum turpentine shipments last month were 729,522 gallons, valued at $262,800, compared with 1,062,076 gallons one year previous, valued at $426,000. Wood rosin, 9,311 barrels, valued at $51,500, against 12,478 barrels, valued at $135,100 during January, 1931. Wood turpentine, 33,655 gallons, valued at $12,386, against 65,319 gallons, valued at $29,200. Tar and pitch exports, 566 barrels, worth $7,461, against 936 barrels, worth $9,015, one year previous. Other gums and rosins exported in January, 291,588 pounds, valued at $52,164, against 514,178 pounds, worth $124,172, during the same time in 1931.

Phosphate Rock — Sales during the past month were exceptionally small when comparison is made with previous months but prices are being held at firm levels. Florida exported 62,311 tons of phosphate to 33 countries during the first half of 1931, according to U. S. Shipping Board figures. Virtually all of this was shipped from Tampa. The U. S. exported 66,729 tons during this period. Japan received 19,403 tons, more than was exported to any other country. The Netherlands took 13,615 tons, Italy 8,346 tons, Atlantic Canada and Newfoundland 8,000, Germany 6,299 and Spain 5,211.

Potash — A brisk pick-up in demand occurred in the last two weeks of February but tonnages to date have proved disappointing to importers. The prices for potash fertilizers sold by the German Syndicate in the domestic market remained the same during 1931 as were established in 1926, with the sanction of the governmental potash committee. While no reductions were made directly in the schedule of prices, the Potash Syndicate, effective Dec. 1, 1930, increased its share of the freight charges from the Sonderhausen official freight base from 10 per cent for distance of 50 to 270 kilometers to 37 per cent to farthest removed points in Germany from the delivery base; moreover, more favorable credit conditions were created for consumers. However, effective Jan. 1, 1932, in compliance with the Government's fourth emergency decree, dated Dec. 8, 1931, providing for the general reduction of prices, wages, and cost of living in Germany, the schedule of prices for potash established in 1926 were reduced by 10%. This reduction, it is understood, was made possible by corresponding reductions in the rates of wages, fuel, etc., also required by the Emergency Decree. New Prices established by German Potash Syndicate effective Jan. 1, 1932:

	Current Market	1932 Low	1932 High	1931 High	1931 Low	1930 High	1930 Low
Orthonitroparachlorphenol, tins ....lb.	.70	.70	.75	.70	.75	.75	.70
Osage Orange, crystals.....lb.	.16	.16	.17	.16	.17	.17	.16
51 deg. liquid.....lb.	.07	.07	.07½	.07	.07½	.07½	.07
Powdered, 100 lb bags.....lb.	.14½	.15	.14½	.15	.14½	.15	.14½
Paraffin, refd, 200 lb cs slabs 123-127 deg. M. P.....lb.	.02⅞	.03	.02⅞	.03	.03¼	.03	.04⅞ .03½
128-132 deg. M. P.....lb.	.....	.03½	.....	.03½	.03½	.03½	.06⅜ .03½
133-137 deg. M. P.....lb	.04¼	.04½	.04¼	.04¾	.04½	.04¼	.07½ .04½
Para Aldehyde, 110-55 gal drs..lb.	.20½	.23	.20½	.23	.20½	.23	.23 .20½
Aminoacetanilid, 100 lb bg..lb.	.52	.60	.52	.60	.52	.60	1.05 .52
Aminohydrochloride, 100 lb kegs.....lb	1.25	1.30	1.25	1.30	1.25	1.30	1.30 1.25
Aminophenol, 100 lb keg...lb.	.78	.80	.78	.80	.82	.86	1.02 .92
Chlorophenol, drums.....lb.	.50	.65	.50	.65	.50	.65	.65 .50
Coumarone, 330 lb drums. lb.	.....	.....	.....	.....	.....	.....	....
Cymene, refd, 110 gal dr..gal.	2.25	2.50	2.25	2.50	2.25	2.50	2.50 2.25
Dichlorobenzene, 150 lb bblr wks.....lb.	.15½	.16	.15½	.16	.15½	.20	.20 .17
Nitrosacetanilid, 300 lb bbls.lb.	.45	.52	.45	.52	.45	.55	.55 .50
Nitroaniline, 300 lb bbls wks .....lb.	.48	.55	.48	.55	.48	.55	.55 .48
Nitrochlorobenzene, 1200 lb drs wks.....lb.	.23	26	.23	.26	.23	.26	.26 .23
Nitro-orthotoluidine, 300 lb bbls.....lb.	2.75	2.85	2.75	2.85	2.75	2.85	2.85 2.75
Nitrophenol 185 lb bbls....lb.	.45	50	.45	.50	.45	.50	.50 .45
Nitrosodimethylaniline, 120 lb. bbls.....lb.	.92	.94	.92	.94	.92	.94	.94 .92
Nitrotoluene, 350 lb bbls....lb.	.29	.31	.29	.31	.29	.31	.31 .29
Phenylenediamine, 350 lb bbls .....lb.	1.15	1.20	1.15	1.20	1.15	1.20	1.20 1.15
Toluenesulfonamide, 175 lb bbls.....lb.	.70	.75	.70	.75	.70	.75	.75 .70
Toluenesulfonchloride, 410 lb bbls wks.....lb.	.20	.22	.20	.22	.20	.22	.22 .20
Toluidine, 350 lb bbls wk...lb.	.42	.43	.42	.43	.40	.44	.40 .38
Paris Green, Arsenic Basis 100 lb kegs.....lb.	.....	.24	.24	.27	.....	.27	.27 .27
250 lb kegs.....lb.	.....	.23	.23	.25	.25	.26	.25 .25
Persian Berry Ext., bbls.....lb.	.25	Nom.	.25	Nom.	.25	Nom.	Nom. .25
Pentasol (see Alcohol, Amyl)...							
Pentasol Acetate (see Amyl Acetate)							
Petrolatum, Green, 300 lb bbl.lb.	.02	.02½	.02	.02½	.02	.02½	.02½ .02
Phenol, 250-100 lb drums....lb.	.14½	.15	.14½	.15	.14½	.15	.15 .14½
Phenyl - Alpha - Naphthylamine, 100 lb kegs.....lb.	.....	1.35	.....	1.35	.....	1.35	1.35 1.35
Phenylhydrazine Hydrochloride .....lb.	2.90	3.00	2.90	3.00	2.90	3.00	3.00 2.90
Phosphate							
Phosphate Acid (see Superphosphate)							
Phosphate Rock, f.o.b. mines Florida Pebble, 68% basis..ton	3.10	3.25	3.10	3.25	3.10	3.25	3.15 3.00
70% basis.....ton	3.75	3.90	3.75	3.90	3.75	3.90	4.00 3.75
72% basis.....ton	4.25	4.35	4.25	4.35	4.25	4.35	4.50 4.25
75-74% basis.....ton	5.25	5.50	5.25	5.50	5.25	5.50	5.50 5.25
75% basis.....ton	.....	5.75	.....	5.75	.....	5.75	5.75 5.75
77-80% basis.....ton	.....	6.25	.....	6.25	.....	6.25	6.25 6.25
Tennessee, 72% basis.....ton	.....	5.00	.....	5.00	.....	5.00	5.00 5.00
Phosphorous Oxychloride 175 lb cyl.....lb.	.18	.20	.18	.20	.18	.20	.25 .18
Red, 110 lb cases.....lb.	.43	.46	.43	.46	.42	.46	.42 .37½
Yellow, 110 lb cases wks..lb.	.31	.37½	.31	.37½	.31	.37½	.37½ .31
Sesquisulfide, 100 lb cs.....lb.	.38	.44	.38	.44	.38	.44	.44 .44
Trichloride, cylinders.....lb.	.18	.20	.18	.20	.18	.20	.25 .18
Phthalic Anhydride, 100 lb bbls wks.....lb.	.15	.16	.15	.16	.15	.16	.20 .15
Pigments Metallic, Red or brown bags, bbls, Pa. wks.....ton	37.00	45.00	37.00	45.00	37.00	45.00	45.00 37.00
Pine Oil, 55 gal drums or bbls Destructive dist.....lb.	.61	.63	.61	.63	.61	.64	.64 .63
Prime bbls.....bbl.	8.00	10.60	8.00	10.60	8.00	10.60	10.60 8.00
Steam dist. bbls.....gal.	.54	.61	.54	.61	.54	.70	.70 .65
Pitch Hardwood, wks.....ton	35.00	45.00	35.00	45.00	5.00	45.00	45.00 35.00
Plaster Paris, tech, 250 lb bbls .....bbl.	3.30	3.50	3.30	3.50	3.30	3.50	3.50 3.30
Platinum, Refined.....oz.	37.50	38.00	37.50	38.00	38.00	38.00	....
Potash							
Potash, Caustic, wks, solid...lb.	.06¼	.06¼	.06¼	.06¾	.06¼	.06¾	.06¼ .06¼
flake.....lb.	.0705	08	0705	.08	.0705	.08	.08 .0705
Potash Salts, Rough Kainit 12.4% basis bulk.....ton	.....	9.20	.....	9.20	.....	9.20	9.20 9.10
14% basis.....ton	.....	9.70	.....	9.70	.....	9.70	9.70 9.60
Manure Salts.....							
20% basis bulk.....ton	.....	12.65	.....	12.65	.....	12.65	12.65 12.50
30% basis bulk.....ton	.....	19.15	.....	19.15	.....	19.15	19.15 18.95
Potassium Acetate.....lb.	.27	.28	.27	.28	.27	.30	.30 .27
Potassium Muriate, 80% basis bags.....ton	.....	37.15	.....	37.15	.....	37.15	37.15 36.75
Pot. & Mag. Sulfate, 48% basis bags.....ton	.....	27.80	.....	27.80	.....	27.80	27.80 27.50
Potassium Sulfate, 90% basis bags.....ton	.....	48.25	.....	48.25	....	48.25	48.25 47.75
Potassium Bicarbonate, USP, 320 lb bbls.....lb.	.07⅞	.09	.07⅞	.09	.07⅞	.10	.10 .09½
Bichromate Crystals, 725 lb casks.....lb.	.08	.08½	.08	.08½	.08	.09	.09½ .08¾
Powd., 725 lb cks wks....lb.	.13	.13½	.13	.13¼	.13	.13	.13¼ .13

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1931 Average $1.404 - Jan. 1931 $1.283 - Feb. 1932 $1.57

(Unit: 100 kilos K_2O)

Product	*Price*
Carnalite 9 to 12 per cent K2O, (for fertilizer use only)	$8.70
Raw salts, 12 to 15 per cent K2O, ground	9.75
Fertilizer salts, 18 to 22 per cent K2O	13.68
Fertilizer salts, 28 to 32 per cent K2O	16.16
Fertilizer salts, 38 to 42 per cent K2O	16.99
Potassium chloride, 50 to 60 per cent K2O	24.30
Potassium chloride over 60 per cent K2O	26.10
Potassium sulfate, with over 42 per cent K2O	28.13
Potassium magnesium sulfate	25.97

Potassium Carbonate — The Schedule on most grades was increased at the end of the month. The new schedule quoted the market at 5.01c to 5.46c per 100 pounds, for the hydrated 86-85% material with the 96-98% calcined material 14c per 100 pounds higher at 5.63c to 6.54c per 100 pounds, according to quantity. Quotations for the other forms of this article were without change.

Shellac — Prices were weaker during the month with buying restricted to small quantities. Total imports for 1931 were 11,200,000 pounds. In 1930 imports amounted to 18,981,560 pounds and 33,335,000 pounds in 1929. General business activity was 30% under normal during 1931, it is estimated but shellac imports showed a much greater reduction.

Soda Ash — February tonnages were an improvement over January but consumers were holding orders down at extremely low figures. One of the chief reasons for restricted tonnages has been the decline in building activity and hence a much lower consumption of ash by glass producers. Total production of polished plate glass in the U. S. for the year 1931 was 86,913,988 square feet as compared to 105,824,074 square feet produced in the preceding year.

Sodium Bichromate — The price level was firmly held at 5c for large size contracts while spot goods were changing hands at around 5½c. Actual shipments were in better volume than in the previous month.

Soda Caustic — Withdrawals against contracts were in much better volume in February, the textile industry again showing the way. Further improvement in the glass industry is indicated by the return of the Ford Co. to a full production schedule. Prices were firm. Both production and consumption of rayon (a large outlet for caustic) in the U. S. during 1931 broke all previous annual records, according to the Textile Organon published by Tubize Chatillon Corp. Consumption at 150,000,000 pounds, an increase of 43% over 1930, exceeded production, which based upon figures covering 96% of the country's capacity, aggregated 143,900,000 pounds, or 31% more than in 1930. Of the 1931 production, 87.8% was viscose. Stocks at the end of 1931

	Current Market	1932 Low	1932 High	1931 High	1931 Low	1930 High	1930 Low
Binoxalate, 300 lb bbls....lb.	.14	.14	.17	.14	.17	.17	.14
Bisulfate, 100 lb kegs....lb.	.16	.16	.30	.16	.30	.30	.30
Carbonate, 80-85% calc. 800 lb casks....lb.	.04¾	.04¾	.05	.04¾	.07¼	.05¾	.05¼
Chlorate crystals, powder 112 lb keg wks....lb.	.08	.08	.08¼	.08	.08½	.09	.08
Chloride, crys bbls....lb.	.04	.04	.04¼	.04	.06	.06	.05½
Chromate, kegs....lb.	.23	.23	.28	.23	.28	.28	.23
Cyanide, 110 lb. cases....lb.	.55	.55	.57½	.55	.57½	.57½	.55
Metabisulfite, 300 lb. bbl...lb.	.11	.11	.13	.11	.13	.13	.12
Oxalate, bbls....lb.	.20	.20	.24	.20	.24	.24	.20
Perchlorate, casks wks....lb.	.09	.09	.11	.09	.12	.12	.11
Permanganate, USP, crys 500 & 100 lb drs wks....lb.	.16	.16	.16½	.16	.16½	.16½	.16
Prussiate, red, 112 lb keg...lb.	.....	.....	.38½	.35	.40	.40	.38
Yellow, 500 lb casks....lb.	.18½	.18½	.21	.18½	.21	.21	.18½
Tartrate Neut, 100 lb keg..lb.	.....	.....	.21	.....	.21	.21	.21
Titanium Oxalate, 200 lb bbls....lb.	.21	.21	.23	.21	.23	.23	.21
Propyl Furoate, 1 lb tins....lb.	.....	5.00	.....	5.00	.....	5.00	5.00	5.00
Pumice Stone, lump bags....lb.	.04	.04	.05	.04	.05	.05	.04
250 lb bbls....lb.	.04½	.04	.06	.04½	.06	.06	.04½
Powdered, 350 lb bags....lb.	.02½	.02½	.03	.02½	.03	.03	.02½
Putty, commercial, tubs..100 lb.	2.35	2.35	2.45	2.35	2.45	.03½	.03½
Linseed Oil, kegs....100 lb.	4.00	4.00	4.75	4.00	4.75	.05½	.05½
Pyridine, 50 gal drums....gal.	1.50	1.50	1.75	1.50	1.75	1.75	1.50
Pyrites, Spanish cif Atlantic ports bulk....unit	.12	.12	.13	.12	.13½	.13½	.13
Quebracho, 35% liquid tks....lb.	.02½	.02½	.03	.02½	.04	.04	.02½
450 lb bbls c-l....lb.	.03½	.03½	.03½	.03½	.03½	.03½	.03½
35% Bleaching, 450 lb bbl .lb.	.04	.05½	.04	.05½	.04	.04½	.05½
Solid, 63%, 100 lb bales cif..lb.	.....	.02½	.....	.02½	.02½	.05½	.05½	.05
Clarified, 64%, bales....lb.	.....	.03½	.....	.03½	.03½	.05½	.05½	.05½
Quercitron, 51 deg liquid 450 lb bbls....lb.	.05½	.06	.05½	.06	.05½	.06	.06	.05½
Solid, 100 lb boxes....lb.	.09½	.13	.09½	.13	.09½	.13	.13	.09½
Bark, Rough....ton	.....	14.00	.....	14.00	.....	14.00	14.00	14.00
Ground....ton	34.00	35.00	34.00	35.00	34.00	35.00	35.00	34.00
R Salt, 250 lb bbls wks....lb.	.40	.44	.40	.44	.40	.44	.45	.40
Red Sanders Wood, grd bbls..lb.	.....	.18	.....	.18	.....	.18	.18	.18
Resorcinol Tech, cans....lb.	.65	.70	.65	.70	.65	1.25	1.25	.90
Rosin Oil, 50 gal bbls, first run ....gal.	.....	.47	.....	.47	.47	.58	.58	.56
Second run....gal.	.....	.51	.....	.51	.51	.61	.61	.59
Rosin								
Rosins 600 lb bbls 280 lb...unit ex. yard N. Y.								
B	.....	3.40	3.30	3.40	3.25	4.95	7.75	5.35
D	.....	3.60	3.40	3.60	3.35	5.50	8.00	5.50
E	.....	3.95	3.55	3.95	3.45	5.90	8.17	5.52½
F	.....	4.10	3.80	4.10	3.70	6.20	8.45	5.55
G	.....	4.10	3.85	4.10	3.75	6.25	8.45	5.60
H	.....	4.20	3.90	4.20	3.80	6.30	8.55	5.60
I	.....	4.20	3.95	4.20	3.85	6.35	8.58	5.62½
K	.....	4.50	4.35	4.50	4.10	6.45	8.65	5.62½
M	.....	5.10	4.75	5.10	4.20	6.70	8.80	5.65
N	.....	5.90	5.50	5.90	4.85	6.95	8.95	6.05
WG	.....	6.25	6.25	6.45	6.15	8.15	9.25	6.85
WW	.....	6.55	.....	6.55	6.45	8.90	9.85	7.85
Rotten Stone, bags mines....ton	24.00	20.00	24.00	20.00	24.00	20.00	30.00	18.00
Lump, imported, bbls....lb.	.05	.07	.05	.07	.05	.07	.07	.05
Selected bbls....lb.	.09	.12	.09	.12	.09	.12	.12	.09
Powdered, bbls....lb.	.02	.05	.02	.05	.02	.05	.05	.02
Sago Flour, 150 lb bags....lb.	.04½	.05	.04½	.05	.04½	.05	.05	.04½
Sal Soda, bbls wks....100 lb.	.....	1.00	.....	1.00	.....	1.00	1.00	1.00
Salt Cake, 94-96% c-l wks. .ton	14.00	15.50	14.00	15.50	14.00	19.00	24.00	15.50
Chrome....ton	13.00	14.50	13.00	14.50	13.00	17.00	25.00	14.50
Saltpetre, double refd granular 450-500 lb bbls....lb.	.06½	.06½	.03½	.06½	.06	.06½	.06½	.06½
Satin, White, 500 lb bbls....lb	.....	.01½	.....	.01½	.....	.01½	.01½	.01½
Shellac Bone dry bbls....lb.	.22	.23	.22	.26	.26	.29	.47	.28
Garnet, bags....lb.	.19	.20	.19	.20	.19	.26	.40	.24
Superfine, bags....lb.	.13½	.14	.13½	.14	.16	.22	.39	.20
T. N. bags....lb.	.12	.13	.12	.13	.14½	.17	.34	.18
Schaeffer's Salt, kegs....lb.	.48	.50	.48	.50	.53	.57	.57	.53
Silica, Crude, bulk mines....ton	8.00	11.00	8.00	11.00	8.00	11.00	11.00	8.00
Refined, floated bags....ton	22.00	30.00	22.00	30.00	22.00	30.00	30.00	22.00
Air floated bags....ton	.....	32.00	.....	32.00	.....	32.00	32.00	32.00
Extra floated bags....ton	32.00	40.00	32.00	40.00	32.00	40.00	40.00	32.00
Soapstone, Powdered, bags f. o. b. mines....ton	15.00	22.00	15.00	22.00	15.00	22.00	22.00	15.00
Soda								
Soda Ash, 58% dense, bags c-l wks....100 lb.	.....	1.17½	.....	1.17½	.....	1.17½	1.40	1.40
58% light, bags....100 lb.	.....	1.15	.....	1.15	.....	1.15	1.34½	1.34½
Contract, bags c-l wks.100 lb.	.....	1.15	.....	1.15	1.15	1.15	1.32	1.32
Soda Caustic, 76% grnd & flake drums....100 lb.	.....	2.90	.....	2.90	.....	2.90	3.35	3.00
76% solid drs....100 lb.	.....	2.50	.....	2.50	.....	2.50	2.95	2.90
Sodium Acetate, tech....450 lb. bbls wks....lb.	.04½	.05	.04½	.05	.04½	.06	.05½	.04
Arsenate, drums....lb.	.25	.35	.25	.35	.25	.35	.19	.18
Arsenite, drums....gal.	.50	.75	.50	.75	.50	.75	1.00	.50
Bicarb, 400 lb bbl....100 lb.	.....	2.25	.....	2.25	2.35	2.35	2.41	2.41

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1931 Average $1.494 - Jan. 1931 $1.283 - Feb. 1932 $1.57

amounted to about seven weeks' supply. Statistics for the past 11 years, in thousands of pounds, follow:

	Production	*Consumption*	*Prod. plus net impts.*
1931	143,900	150,100	145,100
1930	110,000	105,300	115,304
1929	119,500	132,250	135,227
1928	97,900	104,500	110,538
1927	75,555	100,500	91,391
1926	63,600	66,250	73,263
1925	51,902	54,750	58,753
1924	38,500	38,250	40,212
1923	36,000	37,500	39,029
1922	24,400	26,000	26,516
1921	15,000	18,250	18,276

Sodium Nitrate — Shipments when compared with this time a year ago are off considerably. Prices are firm for both Chilean material and synthetic. Several large shipments of the latter have been made abroad and reports come in that the synthetic plant at Hopwell is now operating at 75% of capacity.

Sodium Phosphates — The weighting centers were taking good sized orders and the price was firmly held at $2.55. Some improvement was also noticeable for the tri salt specially repackers of small quantities for retail trade.

Sodium Silicate — Shipments for the corrugated box industry was reported to be in good volume. The silk centers were taking fair deliveries of water white. Prices were firm.

Solvent Naphtha — Producers held prices at former levels despite some slackening in demand.

Sulfur — Some improvement was in evidence from fertilizer manufacturers operating acid plants. The firm position of the price structure remained unchanged.

Tanning Materials — Prices of most of the members of this group were slightly lower despite a gradual improvement in demand from the industry.

Tin Salts — All prices were repeated with tin showing firm tendencies.

Zinc — The price of the metal sank to a new low level during the month and forced a lowering of the schedules for zinc oxide and zinc dust. The outlook still appears very unpromising and buyers are restricting buying to very small quantities. According to the American Zinc Institute, Inc., a total of 22,516 short tons of slab zinc were produced during the month of January 1932 as compared with 32,522 tons in the corresponding period in 1931 and 52,010 tons in January 1930. The monthly average production during 1931 amounted to 25,089 tons as against a monthly average of 42,039 tons in 1930. Shipments during January 1932 totaled 22,455 short tons as compared with 31,064 tons in the same month last year and 40,704 tons in January 1930. The monthly average ship-

	Current Market	1932 Low	1932 High	1931 High	1931 Low	1930 High	1930 Low
Bichromate, 500 lb cks wks lb.	.05	.05½	.05	.05¾	.05	.07½	.07½	.07
Bisulfite 500 lb bbl wks ...lb.	..	.04	.....	.04	....	.04	.04	.04
Chlorate, ... wks lb.	.05½	.07½	.05¾	.07½	.05½	.07½	.08	.05½
Chloride, technical..... ton	12.00	13.00	12.00	13.00	12.00	13.00	13.00	12.00
Cyanide, 96-98%, 100 & 250 lb drums wks.....lb.	16	17	.16	.17	.16	.17	.20	.16
Fluoride, 300 lb bbls wks...lb.	.07	.07½	.07	.07½	.07	.08½	.09	.08½
Hydrosulfite, 200 lb bbls f. o. b. wks.....lb.	.22	24	.22	.24	.22	24	.24	.22
Hypochloride solution, 100 lb cbys.....lb.	.....	.05	.....	.05	.....	.05	.05	.05
Hyposulfite, tech, pea cyrs 375 lb bbls wks.....100 lb.	2.40	3.00	2.40	3.00	2.40	3.00	3.00	2.40
Technical, regular crystals 375 lb bbls wks....100 lb.	2.40	2.65	2.40	2.65	2.40	2.65	2.65	2.50
Metanilate, 150 lb bbls... lb.	.44	.45	.44	.45	.44	.45	.45	.44
Metasilicate, c-l, wks...100 lb.	.....	4.00	.....	4.00	.....	4.00	.....	.....
Monohydrate, bbls..... lb.	..	.02½	.....	.02½	.....	.02½	.02½	.02½
Naphthionate, 300 lb bbl...lb.	.52	.54	.52	.54	.52	.54	.57	.52
Nitrate, 92%, crude, 200 lb bags c-l NY.....100 lb.	.....	1.73½	.....	1.73½	1.73½	2.07	2.22½	1.99
Nitrite, 500 lb bbls spot....lb.	.07½	08	.07½	.08	.07½	.08	.08	.07½
Orthochlorotoluene, sulfonate, 175 lb bbls wks.....lb	.25	.27	.25	.27	25	.27	.27	.25
Perborate, 275 lb bbls.....lb.	.18	.20	.18	.20	.18	.20	.20	.18
Phosphate, di-sodium, tech. 310 lb bbls.....100 lb.	2.65	2.75	2.65	2.75	2.50	3.00	3.25	2.65
tri-sodium, tech, 325 lb bbls.....100 lb.	.....	3.20	.....	3.20	3.15	3.50	4.00	3.25
Picramate, 100 lb kegs.....lb.	.69	.72	.69	.72	.69	.72	.72	.69
Prussiate, Yellow, 350 lb bbl wks.....lb.	.11½	.12	.11½	.12	.11½	.12	12½	.11½
Pyrophosphate, 100 lb keg..lb.	.15	.20	.15	.20	.15	.20	.20	.15
Silicate, 60 deg 55 gal drs, wks .....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70	1.70	1.6
40 deg 55 gal drs, wks .....100 lb.	.....	.75	.....	.75	.75	1.00	.80	.70
Silicofluoride, 450 lb bbls NY .....lb.	.....	.05½	.....	.05½	.04	.04½	.05½	.04
Stannate, 100 lb drums....lb.	.18	.19	.18	.19	.18	.26	.43	.24
Stearate, bbls.....lb.	.20	.25	.20	.25	.20	.25	.29	.20
Sulfanilate, 400 lb bbls.....lb.	.16	.18	.16	.18	.16	.18	.18	.16
Sulfate Anhyd, 550 lb bbls c-1 wks.....lb.	.02	.02¼	.02	.02¾	.02	.02¼	.02¼	.02¼
Sulfide, 80% crystals, 440 lb bbls wks.....lb.	.02½	.02¾	.02½	.02¾	.02½	.02¼	.02¼	.02½
62% solid, 650 lb drums lc-1 wks.....lb.	.03	.03½	.03	.03½	.03	.03½	.03½	.03
Sulfite, crystals, 400 lb bbls wks.....lb.	.03	.03½	.03	.03½	.03	.03½	.03½	.03
Sulfocyanide, bbls.....lb.	.28	.35	.28	.35	.28	.35	.35	.28
Tungstate, tech, crystals, kegs .....lb.	.80	.88	.80	.88	.80	.88	.88	.81
Solvent Naphtha, tanks..... wks.....gal.	.26	.28	.26	.28	.24	.38	.40	.30
Spruce, 25% liquid, bbls.....lb.	.....	.01	.....	.01	.01	.01½	.01½	.01½
25% liquid, tanks wks.....lb.	.....	.01	.....	.01	.....	.01	.01	.01
50% powd, 100 lb bag wks lb.	.02	.02½	.02	.02½	.02	.02½	.02½	.02
Starch, powd., 140 lb bags .....100 lb.	.....	2.67	.....	2.67	2.57	3.20	4.02	3.42
Pearl, 140 lb bags.....100 lb.	.....	2.57	.....	2.57	2.57	3.00	3.92	3.32
Potato, 200 lb bags.....lb.	.05½	.06	.05½	.06	.05½	.06	.06½	.05½
Imported bags.....lb.	.05½	.06½	.05½	.06½	.05½	.06½	.06½	.05½
Soluble.....lb.	.08	.08½	.08	.08½	.08	.08½	.08½	.08
Rice, 200 lb bbls.....lb.	.09	.10	.09	.10	.09	.10	.10	.09
Wheat, thick bags.....lb.	.06½	.07	.06½	.07	.06½	.07	.07	.06½
Thin bags.....lb.	.09½	.10	.09½	.10	.09½	.10	.10	.09½
Strontium carbonate, 600 lb bbls wks.....lb.	.07½	.07½	.07½	.07½	.07½	.07½	.07½	.07½
Nitrate, 600 lb bbls NY....lb.	.07	.07½	.07	.07½	.07	.09½	.09½	.09
Peroxide, 100 lb drs.....lb.	.....	1.25	.....	1.25	.....	1.25	1.25	1.25
Sulfur								
Sulfur Brimstone, broken rock, 250 lb bag c-1.....100 lb.	.....	2.05	.....	2.05	.....	2.05	2.05	2.05
Crude, f. o. b. mines.....ton	18.00	19.00	18.00	19.00	18.00	19.00	19.00	18.00
Flour for dusting 99½% 100 lb bags c-1 NY....100 lb.	.....	2.40	.....	2.40	.....	2.40	2.40	2.40
Heavy bags c-1.....100 lb.	.....	2.50	.....	2.50	.....	2.50	2.50	2.50
Flowers, 100%, 155 lb bbls c-1 NY.....100 lb.	.....	3.45	.....	3.45	.....	3.45	3.45	3.45
Roll, bbls lc-1 NY.....100 lb.	2.65	2.85	2.65	2.85	2.65	2.85	2.85	2.65
Sulfur Chloride, red, 700 lb drs wks.....lb.	.05	.05½	.05	.05½	.05	.05½	.05½	.05
Yellow, 700 lb drs wks.....lb.	.03½	.04½	.03½	.04½	.03½	.04½	.04½	.03½
Sulfur Dioxide, 150 lb cyl....lb.	.07	.07½	.07	.07½	.07	.07½	.07½	.07
Extra, dry, 100 lb cyl.....lb.	.10	.12	.10	.12	.10	.12	.12	.10
Sulfuryl Chloride,.....lb.	.15	.40	.15	.40	.15	.40	.65	.10
Talc, Crude, 100 lb bgs NY...ton	12.00	15.00	12.00	15.00	12.00	15.00	15.00	12.00
Refined, 100 lb bgs NY..ton	16.00	18.00	16.00	18.00	16.00	18.00	18.00	16.00
French, 220 lb bags NY...ton	18.00	22.00	18.00	22.00	18.00	22.00	22.00	18.00
Refined, white, bags....ton	35.00	40.00	35.00	40.00	35.00	40.00	40.00	35.00
Italian, 220 lb bags NY...ton	40.00	50.00	40.00	50.00	40.00	50.00	50.00	40.00
Refined, white, bags....ton	50.00	55.00	50.00	55.00	50.00	55.00	55.00	50.00
Superphosphate, 16% bulk, wks..... ton	.....	8.00	.....	8.00	7.50	9.00	9.50	8.00
Triple bulk, wks.....unit	.....	.65	.....	.65	.....	.65	.65	.65
Tankage Ground NY.....unit	.....	1.50&10	.....	1.50&10	1.50	3.20&10	4.00&10	3.20&10
High grade f.o.b. Chicago.unit	.....	1.50&10	.....	1.50&10	1.50	3.25&10	3.85&10	3.25&10
South American cif.....unit	.....	2.25&10	.....	2.25&10	2.00	3.40&10	4.25&10	3.40&10
Tapioca Flour, high grade bgs .lb.	.03½	.05	.03½	.05	.03½	.05	.05½	.03
Medium grade, bags....lb.	.03	04	.03	.04	.03	.04	.04½	.02½
Tar Acid Oil, 15%,drums....gal.	.21	.22	.21	.22	.21	.25	.27	.24
25% drums.....gal.	.23	.24	.23	.24	.23	.28	.30	.26

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ments during 1931 were 26,239 tons as against 36,356 during 1930. Inventories at the end of January 1932 amounted to 129,886 short tons, as compared with 129,825 tons at Dec. 31, 1931 and 145,076 tons at Jan. 31, 1931. The Institute's statement follows:

Slab Zinc Statistics (all grades), 1931 and 1932 (Tons of 2000 Lbs.)

Month	*Produced During Month*	*Shipped During Month*	*Stock at End of Month*
1931			
January	32,522	31,064	145,076
February	29,562	30,249	144,389
March	32,328	35,224	141,493
April	29,137	27,418	143,212
May	25,688	25,851	143,049
June	23,483	27,604	138,928
July	21,365	28,460	131,833
August	21,467	23,599	129,701
September	21,356	20,902	130,155
October	21,674	21,163	130,666
November	20,526	20,327	130,865
December	21,965	23,005	129,825
Total for year	301,073	314,866	
Monthly aver	25,089	26,239	
1932			
January	22,516	22,455	129,886

xExport shipments are included in total shipments.

Month of January	*1932*	*1931*	*1930*
Average retorts oper.	21,001	32,737	61,612

Zinc Dust — A revision of prices downward 10 points was announced as the metal went to a new low level.

FATS AND OILS

The market generally for fats and oils witnessed lower prices for the first two weeks of the month followed by some strengthening of prices in sympathy with the generally better prices prevailing in the stock market and in some of the commodity markets. The firm position of Chinawood Oil continued with conditions in China still unsettled. Sales were made in most items for immediate delivery and in small lots but the general tone of the market appeared better than it has been in several months. Practically all of the vegetable oils, chinawood, cocoanut, copra, corn and palm oils were slightly higher, the animal oils while they did not register any announced increases did have a decidedly firmer tone and the same conditions prevailed in the fish oil group. Generally speaking the oils in the animal group did not participate in the slight improvement.

Department of Commerce announces that according to Census returns the factory production of fats and oils (exclusive of refined oils and derivatives) during the three-month period ended December 31, 1932, was as follows: vegetable oils, 1,032,935,862 pounds; fish oils, 17,677,142 pounds; animal fats, 576,013,339 pounds; and greases, 94,569,172 pounds; a total of 1,721,195,515 pounds.

	Current Market	1932 Low	1932 High	1931 High	1931 Low	1930 High	1930 Low
Terra Alba Amer. No. 1, bgs or bbls mills....100lb.	1.15	1.15	1.75	1.15	1.75	1.75	1.15
No. 2 bags or bbls...100lb.	1.50	1.50	2.00	1.50	2.00	2.00	1.50
Imported bags....lb.	.01½	.01	.01½	.01½	.01½	.01½	.01½
Tetrachlorethane, 50 gal dr...lb.	.09	.09	.09½	.09	.09½	.09½	.09
Tetralene, 50 gal drs wks....lb.	.....	.20	.....	.20	.....	.20	.20
Thiocarbanilid, 170 lb bbl....lb.	.25	.28½	.25	.28½	.25	.28½	.22
Tin.....							
Crystals, 500 lb bbls wks...lb.	.23½	.24	.23½	.24	.23	.28½	.34	.25
Metal Straits NY....lb.	.....	.22½	.21½	.22½	.21½	.27	.38	.26
Oxide, 300 lb bbls wks....lb.	.....	.23	.....	.23	.23	.29	.42	.25
Tetrachloride, 100 lb drs wks .....lb.	.....	.165	.....	.165	.1605	.19½	.20½	.18½
Titanium Dioxide 300 lb bbl..lb	.20½	.21	.20½	.21	.20½	.22	.50	.21
Pigment, bbls....lb.	.06½	.07½	.06½	.07½	.06½	.07½	.07½	.06½
Toluene, 110 gal drs....gal.	.....	.35	.....	.35	.34	.35	.40	.35
8000 gal tank cars wks....gal.	.....	.30	.....	.30	.27	.30	.35	.30
Toluidine, 350 lb bbls....lb.	.88	.89	.88	.89	.88	.94	.94	.90
Mixed, 900 lb drs wks....lb.	.27	.32	.27	.32	.27	.32	.32	.27
Toner Lithol, red, bbls....lb.	.90	.95	.90	.95	.90	.95	.95	.90
Para, red, bbls....lb.	.....	.80	.....	.80	.....	.80	.80	.80
Toluidine....lb.	1.50	1.55	1.50	1.55	1.50	1.55	1.55	1.50
Triacetin, 50 gal drs wks....lb.	.32	.36	.32	.36	.32	.36	.36	.32
Trichlorethylene, 50 gal dr...lb.	.10	.10½	.10	.10½	.10	.10½	.10½	.10
Triethanolamine, 50 gal drs...lb.	.40	.42	.40	.42	.40	.42	.42	.40
Tricresyl Phosphate, drs....lb.	.25½	.26	.25½	.26	.26	.45	.45	.33
Triphenyl guanidine....lb.	.58	.60	.58	.60	.58	.60	.60	.58
Phosphate, drums....lb.	.50	.65	.50	.65	.50	.70	.70	.60
Tripoli, 500 lb bbls....100 lb.	.75	2.00	.75	2.00	.75	2.00	2.00	1.75
Tungsten, Wolframite,..per unit	11.00	11.75	11.00	11.75	11.00	11.75	.....	.....
Turpentine carlots, bbls....gal.	.....	.41½	.39	.41½	.36½	.57	.61½	.41
Wood Steam dist. bbls....gal.	.44	.45	.44	.45	.38	.61	.52	.36
Urea, pure, 112 lb cases....lb	.15	.17	.15	.17	.15	.17	.17	.15
Fert. grade, bags c.i.f....ton	....	82.60	.....	82.60	.....	82.60	108.00	108.00
c. i. f. S. points....ton	.....	82.60	.....	82.60	.....	82.60	109.30	109.30
Valonia Beard, 42%, tannin bags....ton	32.00	32.50	32.00	34.00	33.00	40.00	40.00	39.50
Cups, 30-31% tannin....ton	22.50	23.50	22.50	23.50	22.50	25.00	27.00	24.00
Mixture, bark, bags....ton	25.00	26.00	25.00	26.00	25.00	31.00	32.50	30.00
Vermillion, English, kegs....lb..	1.53	1.80	1.53	1.80	1.53	1.80	2.05	1.75
Vinyl Chloride, 16 lb cyl....lb.	.....	1.00	.....	1.00	.....	1.00	1.00	1.00
Wattle Bark, bags....ton	29.00	33.00	29.00	33.00	32.00	41.00	47.75	40.00
Extract 55%, double bags ex-dock....lb.	.05	.06½	.05	.06½	.05	.06½	.06½	.05½
Whiting, 200 lb bags, c-l wks .....100 lb.	.85	1.00	.85	1.00	.85	1.00	1.00	1.00
Alba, bags c-l NY....ton	.....	13.00	.....	13.00	.....	13.00	13.00	13.00
Gilders, bags c-l NY...100 lb.	.....	1.35	.....	1.35	.....	1.35	1.35	1.35
Xylene, 10 deg tanks wks. .gal.	.....	.29	.....	.29	.....	.29	.31	.28
Commercial, tanks wks...gal.	....	.26	.....	.26	.24	.30	.33	.25
Xylidine, crude....lb.	.36	.37	.36	.37	.36	.37	.38	.37

Zinc

Zinc Ammonium Chloride powd., 400 lb bbls....100 lb.	5.25	5.25	5.75	5.25	5.75	5.75	5.75	5.25
Carbonate Tech, bbls NY..lb.	.10½	.10½	.11	.10½	.11	.11	.11	.10½
Chloride Fused, 600 lb drs. wks....lb.	.05½	.05½	.06	.05½	.06	.05½	.06	.06	.05½
Gran., 500 lb bbls wks....lb.	.05½	.05½	.06	.05½	.06	.05½	.06	.06½	.05½
Soln 50%, tanks wks...100 lb.	2.25	2.25	3.00	2.25	3.00	3.00	3.00	2.25
Cyanide, 100 lb drums....lb	.38	.38	.39	.38	.39	.39	.41	.38
Dithiofuroate, 100 lb dr....lb.	.....	1.00	.....	1.00	.....	1.00	1.00	1.00
Dust, 500 lb bbls c-l wks...lb.	.0505	.0505	.0515	.0525	.0515	.07	.11	.06
Metal, high grade slabs c-l NY....100 lb.	3.195	3.195	3.21	3.22½	3.50	4.45	6.45	4.10
Oxide, American bags wks..lb.	.06½	.06½	.07	.07	.06½	.07	.07½	.06½
French, 300 lb bbls wks...lb.	.09½	.09½	.11½	.11½	.09½	.11½	.11½	.09½
Perborate, 100 lb drs....lb.	.....	1.25	.....	1.25	.....	1.25	1.25	1.25
Peroxide, 100 lb drs....lb.	.....	1.25	.....	1.25	.....	1.25	1.25	1.25
Stearate, 50 lb bbls....lb.	.18½	.18½	.22	.22	.18½	.23	.26	.20
Sulfate, 400 bbl wks....lb.	.03	.03	.03½	.03	.03	.03½	.03½	.03
Sulfide, 500 lb bbls....lb.	.13	.13	.13½	.13	.13	.16½	.32	.16
Sulfocarbolate, 100 lb keg..lb.	.22	.22	.24	.22	.22	.30	.30	.28
Zirconium Oxide, Nat. kegs..lb.	.02½	.02½	03	.02½	.03	.03	.03	.02½
Pure kegs....lb.	.45	.45	.50	.45	.50	.50	.50	.45
Semi-refined kegs....lb.	.08	.08	.10	.08	.10	.10	.10	.08

Oils and Fats

Castor, No. 1, 400 lb bbls....lb.	.....	.10½	.09½	.10½	.10	.12	.13½	.11½
No. 3, 400 lb bbls....lb.	.09½	.10½	.09¾	.10½	.09½	.11¾	.13	.11
Blown, 400 lb bbls....lb.	.12	.12½	.12	.12½	.12½	.14	.15	.12
China Wood, bbls spot NY..lb.	.07⅝	.07¾	.07	.07¾	.07	.07½	.13	.07
Tanks, spot NY....lb.	.06¾	.06¾	.06	.06¾	.06	.07	.11¾	.06
Coast, tanks,....lb.	.06¾	.06½	.05⅝	.06½	.05½	.06½	.10¾	.05½
Cocoanut, edible, bbls NY....lb.	....	.10½	.....	.10½	.....	.10½	.10½	.10½
Ceylon, 375 lb bbls NY....lb.	.04½	.04¾	.04¾	.04¾	.04½	.06½	.08¼	.06½
8000 gal tanks NY....lb.	.03½	.03½	.03¾	.03¾	.03½	.06	.07	.05½
Cochin, 375 lb bbls NY....lb.	.05½	.06	.05½	.06	.05½	.07	.09½	.07¼
Tanks NY....lb.	.04½	.05	.04¾	.05	.04½	.05¾	.08½	.07
Manila, bbls NY....lb.	.04½	.05	.04¾	.05	.04½	.07	.08½	.06½
Tanks NY....lb.	.03½	.04	.03⅝	.04	.03½	.05½	.07½	.05½
Tanks, Pacific Coast....lb.	.....	.03½	.....	.03½	.03	.05	.07	.05½

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1931 Average $1.404 - Jan. 1931 $1.283 - Feb. 1932 $1.57

Production, Consumption, and Stocks of Fats and Oils

(In some cases, where products were made by a continuous process, the intermediate products were not reported.)

(000 omitted)

Kind	Factory operations for the quarter ended Dec. 31, 1931 Prod. (pounds)	Consump. (pounds)	Factory and Warehouse stocks, Dec. 31, 1931 (pounds)
Vegetable Oils: (1)			
Cottonseed, crude	765,620	703,916	126,760
Cottonseed, ref'd	659,225	297,179	489,866
Peanut, virgin and crude	3,319	2,080	5,046
Peanut, refined	1,899	2,982	1,530
Coconut, or copra, crude	68,701	142,434	188,352
Coconut, or copra, refined	70,169	78,039	14,800
Corn, crude	30,223	33,927	10,386
Corn, refined	30,214	7,921	12,873
Soybean, crude	10,655	7,748	13,635
Soybean, refined	5,298	3,691	4,714
Olive, edible	128	658	4,216
Olive, inedible	.....	1,518	1,376
Sulphur oil or olive foots	.....	8,527	8,981
Palm-kernel, crude	4,950	12,162	8,440
Palm-kernel refined	6,693	5,938	1,663
Rapeseed	.....	2,045	3,866
Linseed	130,478	57,354	154,490
Chinese wood or tung	.....	16,746	33,413
Chinese vegetable tallow	.....	892	634
Castor	11,882	3,517	11,887
Palm	.....	51,756	89,053
Sesame	6,265	7,882	10,703
Sunflower seed	.....	2,804	338
All other	910	1,350	7,463
Fish Oils: (1)			
Cod & cod-liver	191	3,065	7,773
Menhaden	1,915	5,916	8,675
Whale	15	15,208	126,717
Herring, including sardine	15,342	16,027	74,997
Sperm	.....	217	3,064
All other, (includ-marine animal):	211	456	16,704
Animal Fats:			
Lard, neutral	7,671	4,712	2,085
Lard, other edible	434,967	5,918	51,035
Tallow, edible	16,551	14,916	4,899
Tallow, inedible	115,653	146,695	163,378
Neat's-foot oil	1,169	1,145	1,184
Greases:			
White	17,483	9,311	10,279
Yellow	21,464	7,080	12,380
Brown	13,908	14,287	21,362
Bone	5,979	40	3,524
Tankage	13,620	83	7,258
Garbage or house	16,919	14,022	21,700
Wool	1,379	924	5,742
Recovered	532	462	5,011
All other	3,281	3,476	3,757
Other Products:			
Lard compounds and other lard substitutes	306,559	837	24,756
Hydrogenated oils	163,830	134,309	27,269
Sterin, vegetable	2,804	4,456	1,847
Stearin, animal, edible	12,729	6,822	4,581
Sterain, animal, inedible	1,986	3,172	7,186
Oleo oil	24,423	8,581	4,864
Lard oil	2,350	2,155	3,989
Tallow oil	3,883	2,244	2,856
Fatty acids	28,857	31,060	8,910
Fatty acids, distilled	9,199	7,680	3,316
Red oil	7,322	4,673	9,666
Stearic acid	5,394	2,128	4,403
Glycerin, crude 80% basis	33,395	34,909	15,368
Glycerin, dynam	12,353	3,840	11,749
Glycerin, chemically pure	16,359	2,021	11,177
Cottonseed foots, 50% basis	71,683	69,428	75,699
Cottonseed foots, distilled	23,150	23,336	7,380

	Current Market	1932 Low	1932 High	1931 High	1931 Low	1930 High	1930 Low
Cod, Newfoundland, 50gal bbls gal.	.....	.30	.....	.30	.26	.48	.56	.46
Tanks NY gal.	.28	.30	.28	.30	.24	.45	.62	.48
Cod Liver see Chemicals								
Copra, bags lb.	.021	.023	.021	.0235	.0195	.0325	.046	.039
Corn, crude, bbls NY lb.	.05¾	.09	.05¾	.09	.05¾	.09	.10	.08½
Tanks, mills lb.	.03½	.03½	.03½	.03½	.03½	.07½	.08	.06½
Refined, 375 lb bbls NY lb.	.06¾	.07	.06¾	.07	.06¾	.10½	.10½	.09½
Tanks lb.	.08½	.08¾	.08½	.08¾	.08	.08¾	.10	.08
Cottonseed, crude, mill lb.	.03	.03½	.03	.03½	.03	.07	.07½	.06½
Degras, American, 50 gal bbls NY lb.	.03½	.04	.03½	.04	.03½	.04¼	.04¼	.03¼
English, brown, bbls NY lb.	.03¾	.04	.03¾	.04	.03¾	.05	.05	.04¼
Light, bbls NY lb.	.04	.04½	.04	.04½	.04	.05½	.05½	.05
Dog Fish, Coast Tanks gal.	.....	.32	.....	.32	.....	.32	.34	.32
Greases								
Greases, Brown lb.	.02	.02½	.02	.02½	.02	.04½	.06½	.04
Yellow lb.	.02½	.03	.02½	.03	.02	.05	.07½	.03½
White, choice bbls NY lb	.03½	.04½	.03¾	.04½	.03¾	.05¼	.08½	.06
Herring, Coast, Tanks gal.	.....	Nom.	.....	Nom.	.....	Nom.	.....	.....
Horse, bbls lb.	.05½	Nom.	.05¼	Nom.	.05¼	Nom.	Nom.	.05½
Lard Oil, edible, prime lb.	.09¾	.10	.09¾	.10	.10¾	.13	.13½	.12½
Extra, bbls lb.	.06¾	.07	.06¾	.07	.07	.10	.12	.10
Extra No. 1, bbls lb.	.06¼	.07	.06¼	.07	.06¼	.09¾	.11	.09¾
Linseed, Raw, five bbl lots lb.	.....	.074	.....	.074	.077	.102	.146	.096
Bbls c-l spot lb.	.....	.066	.....	.066	.069	.098	.142	.092
Tanks lb.	.....	.06	.....	.06	.063	.092	.134	.086
Menhaden Tanks Baltimore gal.	.17½	.20	.17½	.20	.14	.22	.50	.21
Extra, bleached, bbls NY gal.	.38	.40	.38	.40	.38	.53	.70	.52
Light, pressed, bbls NY gal.	.33	.34	.33	.34	.33	.38	.64	.36
Yellow, bleached, bbls NY gal.	.36	.37	.36	.37	.30	.42	.67	.38
Mineral Oil, white, 50 gal bbls gal.	.40	.60	.40	.60	.40	.60	.60	.40
Russian, gal gal.	.95	1.00	.95	1.00	.95	1.00	1.00	.95
Neatsfoot, CT, 20° bbls NY lb.	.13¼	.13½	.13¼	.13½	.13¼	.16	.17½	.16½
Extra, bbls NY lb	.06½	.06¾	.06½	.07	.07	.10	.11½	.09½
Pure, bbls NY lb.	.08¾	.09	.08¾	.09	.09½	.12	.13½	.11½
Oleo, No. 1, bbls NY lb.	.06⅝	.07	.06⅝	.07	.06⅝	.08	.12½	.08¼
No. 2, bbls NY lb.	.05⅝	.06	.05⅝	.06	.05¾	.08	.11	.08¼
No. 3, bbls NY lb.	.....	.06¼	.....	.06¾	.06¼	.09	.10½	.09
Olive, denatured, bbls NY gal.	.63	.65	.62	.65	.59	.80	1.00	.70
Edible, bbls NY gal.	1.65	2.00	1.65	2.00	1.50	2.00	2.00	1.75
Foots, bbls NY lb.	.....	.05	.04½	.05	.04½	.06¾	.08	.06
Palm, Kernel, Casks lb.	.....	.04¾	.03¾	.04¾	.04¼	.06¼	.08½	.06
Lagos, 1500 lb casks lb.	.04	.05	.04	.05	.04	.06	.07¾	.05¼
Niger, Casks lb.	.03¾	.03¾	.03¾	.03½	.03½	.05¼	.07¼	.05½
Peanut, crude, bbls NY lb.	.03¾	.04	.03¾	.04	.03¾	.05	Nom.	.....
Refined, bbls NY lb.	.08½	.09	.08½	.09	.08½	.14	.15	.12
Perilla, bbls NY lb.	.05¾	.05½	.05¼	.05¾	.05½	.11	.14½	.10
Tanks, Coast lb.	.....	.05	.....	.05	.05	.09	.11½	.08
Poppyseed, bbls NY gal.	1.70	1.75	1.70	1.75	1.70	1.75	1.75	1.70
Rapeseed, blown, bbls NY gal.	.68	.70	.68	.70	.68	.73	1.00	.74
English, drms. NY gal.	.....	.75	.....	.75	.....	.75	.82	.75
Japanese, drms. NY gal.	.56	.58	.56	.58	.56	.58	.70	.56
Red, Distilled, bbls lb.	.06½	.06¾	.06½	.07	.07¾	.09	.10¾	.08¾
Tanks lb.	.05½	.06	.05¾	.06	.06½	.08¼	.09½	.07¼
Salmon, Coast, 8000 gal tks. gal.	.....	.19	.....	.19	.19	.22	.44	.42
Sardine, Pacific Coast tks gal.	.17	.17½	.17	.17½	.17	.19	.42	.18
Sesame, edible, yellow, dos lb.	.08½	.09	.08½	.09	.08½	.10¾	.12	.09
White, dos lb.	.10	.11	.10	.11	.10	.12	.12½	.10
Sod, bbls NY gal.	.....	.40	.....	.40	.....	.40	.40	.40
Soy Bean, crude								
Pacific Coast, tanks lb.	.03	.03½	.03	.03½	.03¼	.08	.09½	.07
Domestic tanks, f.o.b. mills, lb.	.....	.03	.03	.032	.032	.07	.08½	.07
Crude, bbls NY lb.	.04¾	.05	.04¾	.05	.04¾	.08	.10¾	.10
Tanks NY lb.	.04½	.04½	.04½	.04½	.04½	.08	.09¾	.09
Refined, bbls NY lb.	.058	.06	.058	.06	.058	.09	.13½	.13
Sperm, 38° CT, bleached, bbls NY gal.	.68	.70	.68	.70	.68	.85	.85	.84
45° CT, bleached, bbls NY gal.	.63	.65	.63	.65	.63	.80	.80	.79
Stearic Acid, double pressed dist bags lb.	.08½	.09	.08½	.09	.08½	.11	.15	.13½
Double pressed saponified bags lb.	.07	.07½	.07	.07½	.08	.12	.15½	.14½
Triple, pressed dist bags lb	.10¼	.11	.10¼	.11	.11	.14	.17	.15½
Stearine, Oleo. bbls lb.	.05½	.06	.05½	.06	.05½	.08¾	.09½	.08¼
Tallow City, extra loose lb.	.03¼	.03⅜	.03¼	.03⅜	.02¾	.04	.07⅜	.04¾
Edible, tierces lb.	.03¾	.04	.03¾	.04	.03¾	.06	.09½	.05½
Tallow Oil, Bbls, c-1 NY lb.	.07	.07½	.07	.07½	.07	.08¾	.11	.08½
Acidless, tanks NY lb.	.07⅞	.09	.07¾	.09	.07¾	.09	.10	.08¾
Vegetable, Coast mats lb.	.06	Nom.	.06	Nom.	.06½	Nom.	Nom.	.06½
Turkey Red, single bbls lb.	.07	.09	.07	.09	.07	.10	.12	.10
Double, bbls lb.	.09	.11	.09	.11	.09	.10	.16	.13
Whale, bleached winter, bbls NY gal.	.....	.74	.....	.74	.....	.74	.74	.74
Extra, bleached, bbls NY gal.	.58	.60	.58	.60	.58	77½	.76	.76
Nat. winter, bbls NY gal.	.53	.55	.53	.55	.53	.72	.73	.73

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"We"—Editorially Speaking

Once again the Bureau of the Census is asking manufacturers to fill out and return promptly the Census of Manufacturers' questionnaires. A special effort is being made to conduct the 1931 canvas by mail, eliminating the expense of personal calls. With the discontinuance of the Dye Census manufacturers in the chemical industry have had their attention called in a very pertinent and unfortunate way to the benefits of government gathered statistics. We urge you to cooperate with the Government in this work.

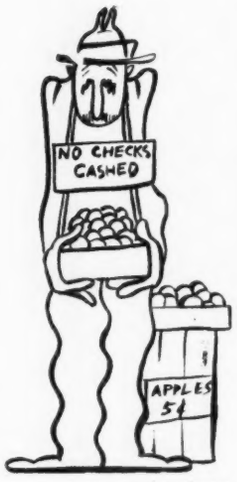
As we go to press the rumor that Messrs. "Salvy" Spitale and Irving Bitz have been engaged by a well-known chemical company to recover the stolen soap contract of 1930 is vigorously denied.

Speaking jovially of the depression as Horace Bowker urges us to do, a chemical company comptroller said yesterday that he didn't mind the wolf at the door, but it was getting to be a nuisance looking for him under the bed each night after prayers.

We note in an English trade paper that J. Luck, Monsanto Chemical, Ltd., has invented a novelty which automatically delivers paper clips as required. We would say that we know of no industry that uses so many paper clips as that of publishing. Need we say that we hope Mr. Luck reads this issue ?

Very few men in America are as thoroughly familiar with chemical developments abroad as is Dr. Lewis H. Marks. In addition to having studied there for several years, he has made several trips to the Continent both before and after the war. A keen observer, he has given special attention to the growth of the cartel movement and it is interesting to note the very definite conclusions he arrives at in his article, "Cartels in Depression."

At one time or another we have presented CHEMICAL MARKETS readers with interesting bits of information about Dr. Mullin's activities. He is now on a year leave of absence from Clemson College and is in the Far East studying various phases of the textile and the textile processing industries. The last time he called on us we spent a very pleasant hour learning about the development of the South as a textile center. His next visit should be even more interesting what with Manchuria, Shanghai, Woosung, et al. Perhaps he will be able to unravel some of the mystery of what it is all about anyway.



—Americana

COMING FEATURES

"Magnesium." An absorbing account of the development of a commercial method of production by the man who is responsible for its success, Dr. John A. Gann, Chief Metallurgist, Dow Chemical.

"Carbon Tet." A history, a review of production methods, and a summary of the many uses for carbon tetrachloride by one who is considered the country's leading authority on the subject—George Fergusson, chief chemist, Pyrene Manufacturing Co.

Also, Drs. Mullin and Hunter continue their valuable summary of the cellulose ether patents; G. MacIntosh turns to the intermediates and finished products in his review of the coal-tar industry.

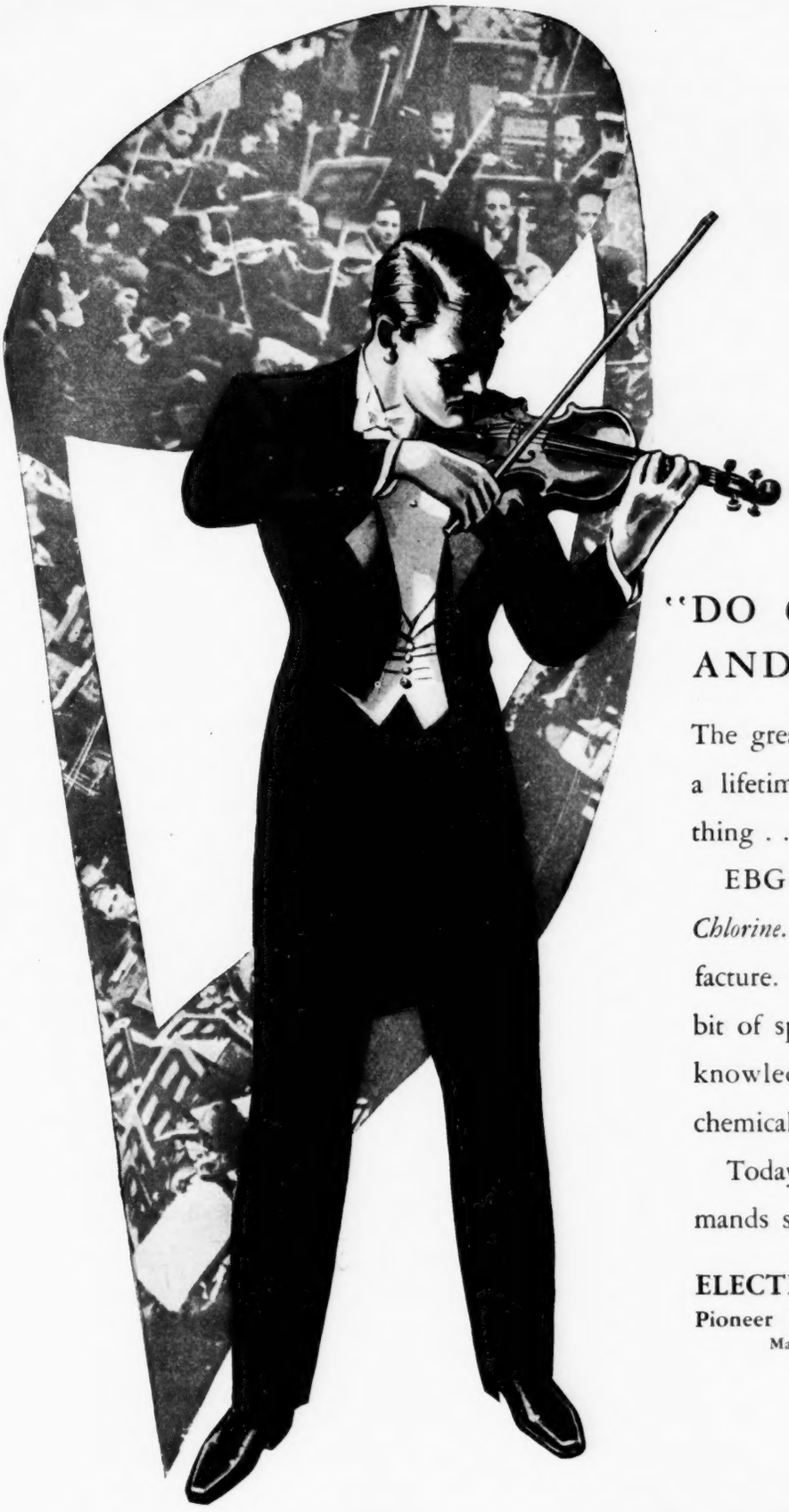
From the recent Safety Council Meeting in New York two valuable papers—"The Technique Which Most Affects The Industrial Executive" by David A. Patton, General Superintendent, Martin Dennis Co. plant, and "Good Housekeeping and What It Means For Safety" by W. H. Winans, Manager, Industrial Relations, Union Carbide and Carbon.

New anesthetics, made of synthetic perfumes, as predicted by Marston T. Bogart smells good to us. Just think what interest they will add to milady's recital of the harrowing details of her pet operation. In the future the conversation over the afternoon bridge table may start off something like this: "Jasmin is just a perfect delight for appendicitis." We wonder what will happen to surgeon's fees when the perfumer becomes the reliever of pain. Who says we are not progressing ?

A detailed account of Dr. William M. Grosvenor's activities would to most of our readers be quite similar to painting the lilly—those of us in the industry are fully acquainted with his standing and the esteem in which he is held, both for his technical knowledge, and the marvelous background of legal training he possesses. Perhaps, however, a goodly number of our readers who are Chesterfields, "Luckies," or Old Gold addicts do not know that they are indebted to Dr. Grosvenor for the superior grade of paper now used in these cigarettes and which make them more enjoyable. Dr. Grosvenor is the ideal chemist. He has not permitted the narrowing of the laboratory to affect his interests. A keen student of all angles of business he has given to the broad subject of Government relations with business—notably taxes and patents, a great deal of serious thought and study, and therefore, speaks with the voice of an authority.

The staid and dignified spirit that has presided over British industry must be changing. The Council of the British Plastics, Moulding, Trade Association at its official inaugural luncheon at the Savoy Hotel used dishes, plates and goblets made out of plastic moulded products of British manufacture! We assume that the tablecloths must have been rayon, and the table-top finished with lacquer. The British chemical press joyfully hailed this innovation. We shall not be surprised if shortly we hear that the famous "Beef eaters" are being fed hot dogs and Sarsaparilla.

"Reciprocity" is the high sounding word of the chemical sales vocabulary which sometimes means a big stick, and sometimes a stick of candy.



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